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A. Module Handbook

**MINISTRY OF HIGHER EDUCATION, SCIENCE, AND
TECHNOLOGY
UNIVERSITY OF LAMPUNG
FACULTY OF TEACHER TRAINING AND EDUCATION**
Jalan Prof. Dr. Sumantri Brojonegoro No.1 Gedong Meneng - Bandar Lampung
35145
Telp./Fax: (0721) 704624 *e-mail*: fkip@unila.ac.id,
laman: <http://fkip.unila.ac.id>

Undergraduate Program of Biology Education HANDBOOK

MODULE

Module Name	Biology Project-Based Entrepreneurship
Module Level, if Applicable	-
Code	KBO625125
Sub-Heading, (*if Applicable)	-
Classes, (*if Applicable)	-
Semester	VI (Semester Enam)
Module Coordinator	Rini Rita T, M, M.Pd.
Lecturers	Rini Rita T. M, M.Pd. Mufidah, S.Pd., M.Pd.
Language	Bilingual (Bahasa and English)
Classification With in the Curriculum	Elective – Optional Course
Teaching Format/Class Hours Per Week During the Semester	Contact hours: 16 weeks x 100 minutes Structured learning: 16 weeks x 120 minutes Independent study: 16 weeks x 100 minutes
Teaching Methods	Lectures (100 minutes)
Workload	Contact Hours: 16 weeks x 100 minutes
Credit Points	2 SKS = (1.28 * 3) = 2.56 ECTS
Prerequisites Courses	-
Course Learning Outcomes (CLOs)	Design experiments and analyze data to demonstrate the solution's performance, then develop an initial business plan (TAM–SAM–SOM, unit economics, supply chain, pricing, projections). Regulatory and sustainability aspects (PIRT/BPOM/SNI/halal certification, biological waste management, a simple LCA) are integrated, and the entire process is communicated professionally through pitches, demos, and team collaboration while upholding scientific integrity. The end result is a tested, market-oriented biology/biotech solution that is commercially viable, regulatory-compliant, and sustainable, with data-driven decision-making
Content	1. Introduction to the project-based entrepreneurship course in biology 2. Market Trends

	3. Data-Driven Opportunity Prioritization 4. Value Proposition & Business Model 5. Market Validation Plan 6. Initial Problem–Solution Fit 7. Laboratory SOPs (Standard Operating Procedures) 8. Designing Experiments 9. Data Analysis + Business Plan 10. Ethical–Professional Reflection 11. Introduction to the project-based entrepreneurship course in biology 12. Market Trends 13. Data-Driven Opportunity Prioritization 14. Value Proposition & Business Model 15. Introduction to the project-based entrepreneurship course in biology 16. Market Trends 17. Data-Driven Opportunity Prioritization 18. Value Proposition & Business Model 19. Market Validation Plan 20. Initial Problem–Solution Fit
Study/Exam Achievements	1. Mid-Semester Examination: 20 2. Final Examination: 20 3. Discussion and Presentation Activities: 20 4. Group Project: 20 5. Individual Project: 15 6. Attendance (minimum 80% class attendance): 5
Examination Methods	Participants are evaluated based on their performance in class lectures: written test and performance practicum based project
Forms of Media	Virtual Class (www.v-class.unila.ac.id) Powerpoint Presentation Materials quizizz.com Related journals
Literature	Primary: 1. R. Tri Priyono dkk. 2023. Project-based entrepreneurial learning (PBEL): a blended model for startup creations at higher education institutions. <i>Journal of Innovation and Entrepreneurship</i> . 2. Syaiful Haq, Nizwardi, Jalinus dkk. 2024. Entrepreneurship Project-Based Practical Learning Model: Development and Implementation. <i>TEM Journal</i> (2024) 3. Alfia Anesya Putri Difa dkk. 2025. The Influence of Entrepreneurial Learning Based on Project-Based Learning and Self-Efficacy on Vocational Students'

	Interest in Entrepreneurship. <i>International Journal of Entrepreneurial Knowledge.</i>
Ethics and Rules	1. Dress clean, neat and polite 2. Not allowed: wearing sandals, wearing t-shirts, long hair 3. Turn off <i>your cell phone during</i> offline and online lectures

Course Coordinator PJMK

(Rini Rita T. Marpaung, M.Pd,)

B. Course Program

STUDY CONTRACT

Course	Kewirausahaan berbasis Projek Biologi
Course code	KBO625125
Semester	VI (Six Semester)
Subject Prerequisites	
Level Study Program	Bachelor's Program (S1)
Lecturer	1. Rini Rita T. Marpaung , S.Pd. , M.Pd. 2. Mufidah, S.Pd., M.Pd
Course Description	Integrating entrepreneurship theory with biological practice so that students can generate innovations that carry not only academic value but also economic, social, and environmental value. Example projects that can be developed include biotechnology-based functional foods, the use of microorganisms, eco-friendly biopesticides, herbal products, and the conversion of biological waste into marketable products.
Course Learning Outcomes (CLOs)	Design experiments and analyze data to validate solution performance, then develop an initial business plan (TAM–SAM–SOM, unit economics, supply chain, pricing, projections). Regulatory and sustainability aspects (PIRT/BPOM/SNI/halal, biological waste management, a simple LCA) are integrated, and the entire process is communicated professionally through pitches, demos, and team collaboration that upholds scientific integrity. The end result is a tested, market-oriented, commercially viable, regulation-compliant, and sustainable biology/biotech solution, with data-driven decision-making
Topic	1. Introduction to the project-based entrepreneurship course in biology 2. Market Trends 3. Data-Driven Opportunity Prioritization 4. Value Proposition & Business Model 5. Market Validation Plan 6. Initial Problem–Solution Fit 7. Laboratory SOPs (Standard Operating Procedures) 8. Designing Experiments 9. Data Analysis + Business Plan 10. Ethical–Professional Reflection 11. Introduction to the project-based entrepreneurship course in biology 12. Market Trends 13. Data-Driven Opportunity Prioritization 14. Value Proposition & Business Model 15. Market Validation Plan 16. Initial Problem–Solution Fit 17. Laboratory SOPs (Standard Operating Procedures) 18. Designing Experiments 19. Data Analysis + Business Plan

	20. Ethical–Professional Reflection
Lecture Strategy	Lectures are conducted with Project Based Learning, discussions, questions and answers and assignments through the Unila V-class LMS.
Instructional Media	Virtual Class (www.v-class.unila.ac.id) Powerpoint Presentation Materials quizizz.com Related journals
Evaluation	Participants are evaluated based on their performance in class lectures: written test and performance practicum based project
Literature	Primary: 1. R. Tri Priyono dkk. 2023. Project-based entrepreneurial learning (PBEL): a blended model for startup creations at higher education institutions. <i>Journal of Innovation and Entrepreneurship</i> . 2. Syaiful Haq, Nizwardi, Jalinus dkk. 2024. Entrepreneurship Project-Based Practical Learning Model: Development and Implementation. <i>TEM Journal</i> 3. Alfia Anesya Putri Difa dkk. 2025. The Influence of Entrepreneurial Learning Based on Project-Based Learning and Self-Efficacy on Vocational Students' Interest in Entrepreneurship. <i>International Journal of Entrepreneurial Knowledge</i>
Ethics and Rules	1. Dress clean, neat and polite 2. Not allowed: wearing sandals, wearing t-shirts, long hair 3. Turn off <i>your cell phone during</i> offline and online lectures

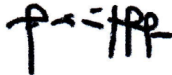
Course Coordinator

(Rini Rita T. Matpaung S.Pd., M.Pd,)



UNIVERSITY OF LAMPUNG
FACULTY OF TEACHER TRAINING AND EDUCATION
DEPARTMENT OF MATHEMATICS AND NATURAL SCIENCES
BIOLOGY EDUCATION STUDY PROGRAM

SEMESTER LEARNING PLAN (RPS)

Course Name	Currency Code Studying	Weight (credits)		Semester	Date of Compilation
Entomology	KBO 620422	2 (2-0)		Odd	July 18, 202 4
Authorization	Developer Coordinator Name RPS		Field Coordinator Skills (If Any)	Head of Study Program	
	Rini Rita T. Marpaung, S.Pd., M.Pd		Rini Rita T. Marpaung, S.Pd., M.Pd	 Rini Rita T. Marpaung, S.Pd., M.Pd.	
Learning Outcomes (CP)	CPL-PRODI (Study Program Graduate Learning Outcomes) Assigned to Courses				
	<u>Attitude</u> 1. Be pious to God Almighty and be able to demonstrate a religious attitude. 2. Internalize scientific values, norms and ethics and be able to develop them through Entomology lectures 3. Collaborate and show a responsible attitude in the field of Entolomolgy studies. 4. Internalize the spirit of independence and fighting spirit and be able to develop it through Entomology lectures. <u>General Skills</u> 1. Applying logical, critical, systematic and innovative thinking in the context of developing or implementing science and technology that pays attention to and applies humanities values that are in accordance with the field of Entomology. 2. Demonstrate independent, quality, and measurable performance through Entomology learning. <u>CP Special Skills</u> 1. Examine the implications of the development or implementation of science and technology that pay attention to and apply humanities values in accordance with the field of Entomology based on scientific rules, procedures and ethics in order to produce solutions, ideas and designs.				

	2. Prepare a scientific description of the results of the Entomologi study in the form of an investigation report. CP Knowledge 1. Mastering facts, concepts, principles, laws, theories and procedures in the field of Entomology in depth and their application. 2. Have sensitivity in finding problems regarding Entomology. 3. Applying logical, critical, systematic and innovative thinking in the context of solving Entomology problems. 4. Communicate recommendations on problem solving in the context of Entomology based on application and research.
	CPMK (Course Learning Outcomes) Merancang eksperimen dan menganalisis data untuk membuktikan kinerja solusi, kemudian menyusun rencana bisnis awal (TAM–SAM–SOM, unit economics, rantai pasok, harga, proyeksi). Aspek regulasi & keberlanjutan (PIRT/BPOM/SNI/halal, pengelolaan limbah biologis, LCA sederhana) diintegrasikan, dan seluruh proses dikomunikasikan secara profesional melalui pitch, demo, dan kolaborasi tim dengan menjunjung integritas ilmiah. Hasil akhirnya adalah solusi biologi/biotek yang teruji, berorientasi pasar, layak bisnis, patuh regulasi, dan berkelanjutan, dengan pengambilan keputusan yang berbasis data
Brief Description of MK	Mengintegrasikan teori kewirausahaan dengan praktik biologi, sehingga mahasiswa mampu menghasilkan inovasi yang tidak hanya memiliki nilai akademik tetapi juga nilai ekonomi, sosial, dan lingkungan. Contoh proyek yang dapat dikembangkan mencakup produk pangan fungsional berbasis bioteknologi, pemanfaatan mikroorganisme, biopestisida ramah lingkungan, produk herbal, hingga pengelolaan limbah biologis menjadi produk bernilai jual.
Study Materials / Learning Materials	1. Introduction to the project-based entrepreneurship course in biology 2. Market Trends 3. Data-Driven Opportunity Prioritization 4. Value Proposition & Business Model 5. Market Validation Plan 6. Initial Problem–Solution Fit 7. Laboratory SOPs (Standard Operating Procedures) 8. Designing Experiments 9. Data Analysis + Business Plan 10. Ethical–Professional Reflection 11. Introduction to the project-based entrepreneurship course in biology 12. Market Trends 13. Data-Driven Opportunity Prioritization

	14. Value Proposition & Business Model	
Reference List	Main:	
	1. R. Tri Priyono dkk. 2023. Project-based entrepreneurial learning (PBEL): a blended model for startup creations at higher education institutions. <i>Journal of Innovation and Entrepreneurship</i> .	
	2. Syaiful Haq, Nizwardi, Jalinus dkk. 2024. Entrepreneurship Project-Based Practical Learning Model: Development and Implementation. <i>TEM Journal</i>	
	3. Alfia Anesya Putri Difa dkk. 2025. The Influence of Entrepreneurial Learning Based on Project-Based Learning and Self-Efficacy on Vocational Students' Interest in Entrepreneurship. <i>International Journal of Entrepreneurial Knowledge</i> .	
Lecturer Name Guardian	1. Rini Rita T. Marpaung, S.Pd., M.Pd. 2. Mufidah, S.Pd., M.Pd.	
Subject prerequisites (if any)	-	

Week	Sub-CPMK (Planned final capability)	Study Materials (Learning Materials)	Learning Forms and Methods [Learning Media & Resources]	Estimated Time	Student Learning Experience	Evaluation		
						Criteria & Forms	Indicator	Weight (%)
1	2	3	4	5	6	7	8	9

I	Introduction to the project-based entrepreneurship course in biology	Study contract Scope of Project-Based Entrepreneurship in Biology	• Lectur es, Discus sions • Media: Video • Materi als: ppt	• <i>e-learnin</i> • V Class • Media: Video, ppt • Learning Resource s: e-book	Face to Face (TM) 2 x 50'	Student presentations, class discussions and lecturer confirmation	• Mid-term written test • Structured assignment assessment	1. Submitting the study contract 2. Explaining the material and scope of the lecture 3. Dividing the work group 4. Direct 5. V-Class Settings 6. Menjelaskan konsep dasar kewirausahaan berbasis Proyek biologi .	5
II	Analyze market dynamics and map the competitive landscape	Market dynamics	• Lectur es, Discus sions • Media: Video • Materi als: ppt	• <i>e-learnin</i> • V Class • Media: Video, ppt • Learning Resource s: e-book	Face to Face (TM) 2 x 50'	Student presentations, class discussions and lecturer confirmation	• Mid-term written test • Structured assignment assessment	1. Present the market size, CAGR, and segmentation; with transparent calculations. 2. Provide a concise sheet showing the market size, CAGR, and segmentation; with transparent calculations.	10
III and IV	Analyze the value proposition & business model.	Value proposition & business model	• Lectur es, Discus sions • Media: Video • Materi als: ppt	• <i>e-learnin</i> • V Class • Media: Video, ppt • Learning Resource s: e-book	Face to Face (TM) 2 x 50'	Student presentations, class discussions and lecturer confirmation	• Mid-term written test • Structured assignment assessment	1. Identify priority segments with clear personas (needs, context, behaviors). 2. Outline intergenerational issues (the current generation's responsibility to future generations), regulatory considerations (PIRT/BPOM/SNI/halal), biosafety, licensing/permits, and process timelines.	10

V-VI I	Analyze the Market Validation Plan	Rencana Validasi Pasar	1. Lectures, Discussions 2. Media: Video, ppt	• e-learning • V Class • Media: Video, ppt	Face to Face (TM) 2 x 50'	Student presentations, class discussions and lecturer confirmation	• Mid-term written test • Structured assignment assessment	1. Analyze the priority segments, with clear inclusion/exclusion criteria, target quotas/respondents per segment, and realistic recruitment channels. 2. Analyze the success metrics and clearly define how they will be demonstrated/validated.	5
Notes : 1. Study Program Graduate Learning Outcomes (CPL-PRODI) are the abilities possessed by each PRODI graduate which are the internalization of attitudes, mastery of knowledge and skills according to the study program level obtained through the learning process. 2. The CPL charged to a course is a number of learning outcomes/study program graduates (CPL-PRODI) which are used to form/develop a course consisting of aspects of attitude, general skills, special skills and knowledge. 3. Course CP (CPMK) is a capability that is specifically described from the CPL that is assigned to the course, and is specific to the study material or learning material of the course. 4. Sub-CP Course (Sub-CPMK) is a capability that is specifically described from CPMK that can be measured or observed and is the final capability planned at each learning stage, and is specific to the learning material of the course. 5. Assessment Criteria are benchmarks used as a measure or yardstick for learning achievement in assessment based on established indicators. Assessment criteria are guidelines for assessors to ensure consistent and unbiased assessment. Criteria can be quantitative or qualitative. 6. The assessment indicators for the ability in the process and results of student learning are specific and measurable statements that identify the ability or performance of students in the process and results of learning.									
VII IX and X	Analyze the initial problem-solution for problem-solving results (PSF).	Problem-solution awal	Lectures, Discussions Media: Video Material s: ppt	• e-learning • V Class • Media: Video, ppt • Learning Resource s: e-book	Face to Face (TM) 2 x 50'	Student presentations, class discussions and lecturer confirmation	• Final Exam Written Test • Structured assignment assessment	1. Explain the PSF criteria 2. Analyze problem-solution alignment 3. Analyze economic value 4. Analyze quality control (QC) and experimental controls 5. Analyze safety, waste, and emergency response	5
XI	Analyze the biology lab SOPs	Biology Laboratory SOPs (Standard Operating Procedures)	Lectures, Discussions Media: Video Material s: ppt	• e-learning • V Class • Media: Video, ppt • Learning Resource s: e-book	Face to Face (TM) 2 x 50'	Student presentations, class discussions and lecturer confirmation	• Final Exam Written Test • Structured assignment assessment	1. Analyze risks & biosafety 2. Analyze materials & reagents 3. Analyze equipment & calibration 4. Analyze procedural steps & critical control points (CCPs)	5
XII	Explain policy and economic instruments:	Policy & Economic Instruments	Lectures, Discussions	• e-learning • V Class • Media:	Face to Face (TM) 2 x	Student presentations, class	• Final Exam Written Test • Structured assignment	1. Explain the basic concepts of environmental economic	

Assessment Rubric

In determining the final value, the weighting percentage is based on the following:

Assessment Components	Percentage Value (%)
1. Mid-term exam	20
2. Final Exam	20
3. Discussion and presentation activities	20
4. Group Project	20
5. Independent Project	15
6. Attendance (minimum 80% attendance at lectures)	5
Amount	100

Kisi-Kisi Soal Ujian Tengah Semester

NO	Learning Outcomes	Questions	Bloom's Taxonomy
1	Analyze market dynamics and map the competitive landscape.	Indonesia's probiotic beverage market grew from IDR 1.20 trillion (2021) to IDR 1.728 trillion (2024). a) Calculate the CAGR for 2021→2024. b) Write 2 opportunity insights + 1 risk, briefly, based on data. 2. Buat BMC v1 untuk solusi bio berbasis proyek Anda dengan menuliskan 4 blok inti berikut dan keterkaitannya: Customer Segments, Value Proposition, Channels, Revenue Streams.	Analyzing (C4) Analyzing (C4)
2	Analyze market dynamics and map the competitive landscape.	3. Case: You are developing a bioplastic product made from cassava waste. The initial target is university students and eco-friendly communities on campus. Questions: a) Draft a Unique Value Proposition (UVP) in 1–2 specific and measurable sentences. b) Link the UVP. tersebut dengan Jobs–Pains–Gains dari segmen target. c) Determine one initial success metric to measure the validity of the UVP. 4. Case: Your team has prepared a BMC for a liquid organic fertilizer product. Initial validation data show: 65% of respondents are willing to try at a price of IDR 25,000 per liter. Only 20% of farmers would repurchase if	Synthesis (C5)

		distribution is online-only. Questions: a) What are the implications of these findings for the Value Proposition and Channels? b) Propose two improvement strategies for the BMC based on the data.	Evaluating (C6)
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Kisi-Kisi Soal Ujian Akhir Semester

NO	Learning Outcomes	Questions	Bloom's Taxonomy
1	Menganalisis Problem–Solution Fit (PSF)	1. Pasar minuman probiotik Indonesia tumbuh dari IDR 1,20 T (2021) menjadi IDR 1,728 T (2024). a) Hitung CAGR 2021→2024. b) Tulis 2 insight peluang + 1 risiko berbasis data singkat. 2. Sebuah tim mengembangkan produk biofertilizer cair. Data validasi pasar awal: 15 wawancara: 40% responden menyatakan akan <i>sangat kecewa</i> jika produk tidak tersedia.	Analyzing (C4) Evaluating (C6)

		Landing page: 1.000 kunjungan → 120 sign-up (12%). WTP: 55% setuju dengan harga target. SUS (System Usability Scale) uji demo: 74. Pertanyaan: a) Analisis apakah PSF awal tercapai, sebutkan ambang batas yang Anda gunakan. b) Jelaskan implikasi data ini pada perbaikan UVP & BMC. c) Rekomendasikan dua langkah validasi berikutnya.	Analyzing (C4) Evaluating (C6)
2	Explain Policy & Economic Instruments	You are asked to create a laboratory SOP for producing a probiotic yogurt prototype. Provide a comparative explanation of the following three economic instruments to support eco-friendly biology-based businesses: 1. Carbon Tax 2. Emissions Trading System (ETS/Cap-and-Trade) 3. Green Financing Questions: a) Define each instrument. b) Compare their mechanisms, advantages–disadvantages, and impacts on production costs. c) Provide implementation scenarios for biotech-based ventures (e.g., bioenergy, biomaterials, or organic fertilizers).	Analyzing (C4) Evaluating (C6)

