Course Information:

Program	:	Bachelor of Secondary Education (Science)
Course Code	:	BSCI1113
Course Title	:	Technology for Teaching and Learning II (Science)
Course Description	:	This course focuses on the application, design, production, utilization, and evaluation of Information and Communications Technology (ICT) materials for teaching and learning science Education Programs. The major requirement for this course is an ICTintegrated and Project-based Learning Plan aligned to the K to 12 curriculum. All the learning activities and requirements will revolve around the student-teacher developed learning plan.
Course Credits	:	3 units, 3 hours lecture (for 18 weeks)
Pre-requisite	:	None
Co-Requisite	:	None
Schedule	:	6:00 pm – 7:30 pm, MW, Science Building LR01
Term & Academic Year	:	1st Semester, AY 2023-2024

University Vision by 2030	:	An inclusive and sustainable University recognized for its global and academic excellence
University Mission	:	To develop innovative leaders and empowered communities by delivering transformative instruction, research, extension and production through Change Drivers and responsive policies

Program Outcomes :

PO-001	-	Articulate and discuss the latest developments in the specific field of practice (PQF level 6 descriptor)
PO-002	-	Effectively communicate orally and in writing using both English and Filipino
PO-003	-	Work effectively and independently in multi-disciplinary and multicultural teams (PQF level 6 descriptor)
PO-004	-	Act in recognition of professional, social, and ethical responsibility
PO-005	-	Preserve and promote "Filipino historical and cultural heritage" (based on RA 7722)
PO-006	-	Participate in the generation of new knowledge or in research and development projects. (CMO 46, series of 2012)
PO-007	-	Acquire the competencies to support "national, regional and local development plans. (RA 7722)
PO-008	-	Articulate the rootedness of education in philosophical, socio-cultural, historical, psychological, and political contexts
PO-009	-	Demonstrate mastery of subject matter/discipline
PO-010	-	Facilitate learning using a wide range of teaching methodologies and delivery modes appropriate to specific learners and their environments
PO-011	-	Develop innovative curricula, instructional plans, teaching approaches, and resources for diverse learners
PO-012	-	Apply skills in the development and utilization of ICT to promote quality, relevant, and sustainable educational practices
PO-013	-	Demonstrate a variety of thinking skills in planning, monitoring, assessing, and reporting learning processes and outcomes

PO-014 - Practice professional and ethical teaching standards sensitive to the local, national, and global realities

PO-015 - Pursue lifelong learning for personal and professional growth through varied experiential and field-based opportunities

PO-016 - Demonstrate deep understanding of scientific concepts and principles

PO-017 - Apply scientific inquiry in teaching and learning

PO-018 - Utilize effective science teaching and assessment methods

Course Outcomes		**Program Outcomes**																
Upon completion of the course, the students should be able to:		**PO-001**	**PO-002**	**PO-003**	**PO-004**	**PO-005**	**PO-006**	**PO-007**	**PO-008**	**PO-009**	**PO-010**	**PO-011**	**PO-012**	**PO-013**	**PO-014**	**PO-015**	**PO-016**	**PO-017**	**PO-018**
CO-001	Demonstrate research-based knowledge on the application, design, production, utilization, and evaluation of Information and Communications Technology (ICT) materials for teaching and learning Science Education Programs																L	P	O
CO-002	Design, produce, utilize, and evaluate Information and Communications Technology (ICT) materials that develop the learners' 21st century skills to facilitate the teaching and learning of Science Education Programs; and																L	P	O
CO-003	Design and implement an ICT-integrated and project-based learning plan aligned with the K to 12 curriculum, focusing on community problem-solving to enhance real-world application of educational technology skills.																L	P	O

Correlating Course Outcome and Program Outcome

(Lecture/Theory-Based Courses)

L *Learned in the course*
P *Practiced in the course*
O *Not yet learned or practiced but there's an opportunity to exist*

(Health-Related/Shop/Laboratory Courses)

I *Introduce the skills in the course*
P *Practice skills in the course with supervision*
D *Demonstrate skills in the course without supervision*

Course Outline and Learning Plan:

Week	Course Outcome Code	Learning Outcomes			Topic *(Content)*	Textbook / References	Methodology *(Teaching-Learning Activities)*	Resources *(Instructional Resources)*	Assessment *(Tools and Tasks)*	Time Frame
		Knowledge	*Skills*	*Attitude*						
Week 1	--	Explain the importance of the University Mission and Vision, and apply the rules and behaviors required in the classroom		Behave according to the goals of the university.	**Overview of the University Mission and Vision, Course Syllabus, Classroom Policies, Academic Code of Conduct**	BPSU Revised Student Handbook	Orientation	Smart TV, Student Handbook	--	3 hours
Weeks 2-3	CO-001 CO-002	Identify the use of ICT to develop 21st century skills: information, media and technology skills, with emphasis on critical thinking and problem solving in the science curriculum guide	Analyze science learning plans in the context of the 21st century skills Enhance the science learning plan to develop 21st century skills through ICT integration	Enhance motivation and enthusiasm in utilizing ICT to cultivate 21st-century skills and foster a growth mindset	**Using ICT in Developing 21st Century Skills/ICT in the 21st Century Skills** A. K-12 Science Curriculum Framework B. 21st century communication skills	Technology for Teaching and Learning 2 (Mathematics and Science Education) by Espique and Silva	Guided review of the K to 12 Curriculum Framework for Science (secondary level) to familiarize students with the intended learning competencies of every year level Guided review of some units in the curriculum guide for science with focus on the development of 21st century skills: critical thinking and problem solving	Course Module; Laptop; Smart TV	Repertory grids presenting units from the curriculum guide vis-a-vis its identified 21st century critical thinking and problem solving and ICT tools Short briefing paper describing learning activities that integrate 21st	6 hours

					C. Learning activities to develop critical thinking and problem solving D. Promoting digital citizenship		Collaborative Group Activity: The students will be divided in groups to work on the following: **Identify and enhance specific units that can be best taught with the use of existing ICTs with explanation* **Plan for at least 1 or 2 major learning activities (based on the identified units) that will facilitate the development of critical and problem-solving skills in their lesson* Interactive lecture with multimedia presentation on Digital Citizenship, relating it to critical thinking and problem-solving skills Exploring various sites focusing on how ICT can develop 21st century skills		century critical and problem-solving skills Annotations on how some ICT tools may enhance sample unit plans in science Group oral presentation and justification of at least one activity the group has constructed Concept map on digital citizenship	

Weeks 4-6	CO-002	Explain the principles of problem-based and project-based learning approaches Explain parts of a problem-based and project-based learning plan			**Developing Problem-based and Project-based Instructional plans** A. Nature of problem-based and project-based approaches B. Project-based multimedia learning C. The 7 essentials for problem-based learning *1. Need to know* *2. A driving question* *3. Student voice and choice* *4. 21st century skills* *5. Inquiry and innovation* *6. Feedback and revision* *7. A publicly presented product* D. Anchored instruction (merging problem-solving with	Technology for Teaching and Learning 2 (Mathematics and Science Education) by Espique and Silva		Course Module; Laptop; Smart TV		9 hours

					content-specific instruction) E. Solving content-specific problems: The ABCs of activity: *1. A for authentic activities* *2. B for building knowledge activities* *3. C for constructing activities*					
Week 7	CO-002		develop a problem-based and project-based learning plan in science with aligned learning outcomes and assessment		F. Writing a problem-based/project-based learning plan 1. Revised Bloom's taxonomy of objectives 2. Developing learning outcomes from the identified science competencies in the chosen unit that best requires ICT integration	Technology for Teaching and Learning 2 (Mathematics and Science Education) by Espique and Silva	Interactive lecture on the principles of problem-based and project-based approaches, the 7 essentials for problem-based learning, anchored instruction, solving content-specific problems: the ABCs of activity Review of some samples of learning plans to identify the parts of a problem-based and project-based learning plans (may benchmark from DepEd, UNESCO)	Course Module; Laptop; Smart TV	Group output: Revised unit plan with aligned learning outcomes and assessment tasks with the integration of IMs created together with sample projects	3 hours

					3. Alignment of competencies, outcomes and assessment with teaching and learning activities for science		Comparison of the differences of problem-based and project-based learning Review revised Bloom's taxonomy of objectives *Collaborative Group Work: Construction of learning outcomes for day 1 lesson of their unit based on the competencies of the curriculum unit chosen considering alignment of outcomes and assessment, integrating a project idea and technology tools appropriate for the unit*			
Week 8	CO-003	**Explain the concept of a Living Lab** **Discuss the importance of a "*Glocal*" way of addressing global issues**	**Identify community-specific educational challenges**		***Introduction to Community Problem Solving through Living Lab*	Living Lab Video (IPAID) accessible through: https://www.youtube.com/watch?v=Po7k4RRMJY8	*Conduct a comprehensive community scan to identify educational challenges suitable for innovative solutions through the effective integration of technology.*	Laptop; Smart TV	*Progress Report; Field notes*	3 hours
Week 9	**INTEGRATION / MIDTERM EXAMINATION**									3 hours

Weeks 10-11	CO-002 CO-003	identify uses of open-ended tools in the teaching-learning of science create student outputs using computer applications as evidence of learning	**Design an instructional plan using technology to address the identified community problems**		**III. Productivity Software Applications/Tools for Teaching and Learning in Science** A. Open-ended tools and their uses in teaching and learning B. Maximizing the use of Microsoft Word, Spreadsheets, and Publisher C. Effective use of PowerPoint and Prezi D. Adobe photoshop and movie maker E. Creating student samples using open-ended tools	Technology for Teaching and Learning 2 (Mathematics and Science Education) by Espique and Silva	Collaborative Group Work Brainstorming on when and how to use open-ended tools in the teaching-learning of science Collaborative Group Work Creation of group outputs for presentation of findings of a chosen concern (environmental issues, AIDS, health specific areas, etc.) using the different open-ended /productivity tools based on a chosen concern *Week 11:* *Students will present their identified educational problems and proposed technological solutions for class-wide review, fostering constructive comments and critiques aimed at enhancing the viability and effectiveness of their solutions.*	Course Module; Laptop; Smart TV	Implementation plan describing how the open-ended tools will be maximized in the implementation of the chosen science unit Presentation of group-made video/selected media format *Progress Report; Field notes*	6 hours
Weeks 12-13	CO-002 CO-003	Explain the characteristics of good/appropriate IMs and technology	create appropriate IMs using technology tools in teaching		**IV. Learning Resources Using Instructional Materials and Technology Tools**	Technology for Teaching and Learning 2 (Mathematics and Science Education)	Make an inventory of IMs and technology tools being used by science teachers though internet research and interview with science teachers	Course Module; Laptop; Smart TV	Summary inventory of IMs and technology tools used by science teachers	6 hours

		tools in teaching science discuss how different types of educational software like drill-and-practice, integrated learning systems, problem-solving software, reference software, simulation, tool and tutorial softwares are used in teaching science	science considering learners' gender, needs, strengths, interest, experiences, as well as their linguistic, cultural, socioeconomic, and religious backgrounds **Implement Living Lab-inspired instructional plan**		A. Technology tools for teaching science B. Characteristics of good/appropriate IMs and technology tools C. A software review and selection process	by Espique and Silva	Interactive lecture on the characteristics of good IMs with the use of multimedia presentation Collaborative Group Work: *Presentation of the different types of educational software and on how each software is used in teaching science* Review on the qualities of good/appropriate IMs and technology tools Collaborative Group Work: *Each group will create instructional materials using technology tools in teaching any of the areas of science taking into account the different characteristics of a good IM* *Implementation of proposed solution to identified problem; Documentation*		Collaborative group output: Formulated criteria to determine the appropriateness of IMs and technology tools Reflection writing on how educational software can be used in teaching science Collaborative group output: *Designed educational software review form* Developed instructional material using technology tools responsive to learners' gender, needs, strengths, interest, experiences, as well as their linguistic, cultural, socioeconomic,	

									and religious backgrounds to be evaluated by the teacher using a rubric *Progress Report; Field notes*	
Weeks 14-16	CO-002 CO-003	Discuss the characteristics of ICT resources in teachings science Determine the relevance and appropriateness of digital and non-digital resources based on context	Develop assessment tool to evaluate the relevance and appropriatenes s of digital and non-digital resources to the learning context Revise digital learning resources in response to varied needs of learners		**V. Digital and Non-digital Resources** A. Characteristics of ICT resources in teaching science B. Relevance and appropriateness of ICT resources C. Assessment tools for selecting relevant and appropriate digital and non-digital resources	Technology for Teaching and Learning 2 (Mathematics and Science Education) by Espique and Silva	Answering of word puzzle containing a mixture of digital and non-digital resource examples which can be classified into two types The students will conduct an Inspection and analysis of lesson exemplars/learning plans that utilized ICT resources based on learning context Reviewing and improving the lesson exemplars that utilized digital or non-digital resources or both Collaborative Group Work: *Each group will Design an assessment tool that can evaluate the relevance and appropriateness of ICT resources to the learning context*	Course Module; Laptop; Smart TV	Listing of characteristics of ICT resources Demonstration teaching of the LP integrating the use of the ICT resources Peer assessment on demo teaching and assessment of the used lesson exemplars Revised lesson exemplar integrating suggestions of teacher and peer on the demo teaching Developed assessment tool	9 hours

							Implementation of proposed solution to identified problem; Documentation; Packaging of Final Output - Video		*Progress Report; Field notes; Packaged Video Material on LL journey*	
Week 17	CO-003		Present final video of living lab journey Write a reflection paper on the significant learnings from the course, including the LL journey		**Culminating Activity**	---	*Presentation and feedbacking on Output; Reflection and Sharing of Significant Learnings from the Course with special emphasis on students' Living Lab experiences*	Laptop; Smart TV	*Reflection paper*	3 hours
Week 18	**INTEGRATION / FINAL EXAMINATION**									3 hours

Main Reference:

- Espique, F. & Silva, D. (2021). Technology for Teaching and Learning 2 (Mathematics and Science Education). Philippines: LORIMAR Publishing Inc.

Other Readings and References:

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- Williams, M.D. (2000). Integrating technology into teaching and learning. Singapore: Pearson Education Asia Pte Ltd.

Course Output (Performance Indicators)

Course Outcomes		**Course Major Output** *(Major Task Assessment Tool)*	**Due Date**
Upon completion of the course, the students should be able to:			
CO-001	Demonstrate research-based knowledge on the application, design, production, utilization, and evaluation of Information		

	and Communications Technology (ICT) materials for teaching and learning Science Education Programs	Electronic Portfolio	TBA
CO-002	Design, produce, utilize, and evaluate Information and Communications Technology (ICT) materials that develop the learners' 21st century skills to facilitate the teaching and learning of Science Education Programs; and		
CO-003	Design and implement an ICT-integrated and project-based learning plan aligned with the K to 12 curriculum, focusing on community problem-solving to enhance real-world application of educational technology skills.	Video on Living Lab Journey	TBA
Final Requirement *(Final Task Assessment)*		Reflection Paper	TBA

Grading System

Class Standing	Percentage
Quizzes	30%
Class Participation	20%
Course Outputs (including LL)	50%
TOTAL	100%

Midterm			Final		
Class Standing	-	70%	Class Standing	-	70%
Term Exam	-	30%	Term Exam	-	30%
Final Rating					
Midterm Grade (50%) + Final Grade (50%) = Final Rating					

Course Policies and Standards:

The following policies are to be observed and implemented inside the classroom by both the Professor and Students.

- Attendance and punctuality must be strictly observed.
- Maintain respect and discipline.
- Active participation in the discussion through sharing of ideas and experiences is encouraged.
- Observe tranquility so as to maintain an environment of focus learning.
- Always check the shared folder/s for relevant readings.
- Be prompt in submitting reports and other requirements.

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