

## C. Congruence and Implementation

C.1. Evidence/s of congruence between educational practices/activities and the VMGO.




-Operational Plan



The operational plan of the university is crafted based on USM's VMGO



Link to USM's Operational Plan:



<https://drive.google.com/file/d/1QXmJDGg57Ha7is7SBU3LZopCDzPtyfIN/view?usp=sharing>



-OPCR crafted based on USMs Strategic Plan (which was crafted based on USM's VMGO)



 <b>UNIVERSITY OF SOUTHERN MINDANAO</b> Kabacan, Cotabato Philippines 									
OFFICE PERFORMANCE COMMITMENT AND REVIEW (OPCR)									
I, <b>PHILIP LESTER P. BENJAMIN</b> of the Office of <b>COLLEGE OF SCIENCE AND MATHEMATICS</b> commit to deliver and agree to be rated on the attainment of the following targets in accordance with the indicated measures for the period of <b>January- December 2024</b> .									
Submitted by:	13-Dec-24	Reviewed by:	Date	Compiled by:	Date	<b>0.00</b> FAILED <b>1.00</b> Poor <b>2.00</b> Unsatisfactory <b>3.00</b> Satisfactory <b>4.00</b> Very Satisfactory <b>5.00</b> Outstanding <b>Rating Scale</b> <b>5 - Outstanding</b> <b>4 - Very Satisfactory</b> <b>3 - Satisfactory</b> <b>2 - Unsatisfactory</b> <b>1 - Poor</b>			
 <b>PHILIP LESTER P. BENJAMIN</b> Dean/ Head of Unit		<b>MARCOS F. MONDERIN</b> Immediate Supervisor		<b>RENEL M. ALUCILJA</b> Director for Planning & Dev't.					
OUTPUT	Success Indicator (Target + Measures)		Actual Accomplishment		Rating				Remarks
CORE FUNCTIONS	85%				Q <sup>1</sup>	E <sup>2</sup>	T <sup>3</sup>	A <sup>4</sup>	
1. Supervision in the Implementation of Mandated Functions									3.50
a. Instruction	65%				2.75	2.47	3.25	2.78	
a. 1 Locally and Globally Competitive Graduates									
a.1.1 Deserving student access to higher education									
Enrollment	839	Number of students to enroll	939	Enrolled 854 students for 2nd Sem Sy 2023-2024. Enrolled 939 students for 1st sem Sy 2024-2025	3.00			3.00	
	100%	Percentage of students to screen or Number of students to screen	100%	All students who applied were screened by admission officers.	5.00	5.00	5.00	5.00	
	5	Number of campaigns and education drive to conduct	7	6 campaigns thru social media and 1 thru guidance office	4.00	5.00	5.00	4.67	




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Scholarship		Number of funding agencies to scout		Department of Science & Technology - Science Education Institute TDP- CONG. JOSE TEJADA TDP- SEN. SONNY ANGARA Sugarcane (SIDA-SGP) TDP- SEN. FRANCIS N. TOLENTINO CHED Half Merit Scholarship Program (HSSP) Scholarship Program for Coconut Farmers and their Families (CoScho) TDP- TUCP - CONG. RAYMOND DEMOCRITO C. MENDOZA TDP- CONG. HORACIO P. SUANSING JR. TDP- CONG. RUDY S. CADAGDAN TDP- CONGW. MA. ALANA SAMANTHA T. SANTOS; SANTEH Foundation Biology: 12 funding agencies were scouted (DIOST JLS5 -3; Biotech -3; MOST-BARMM -2; Provincial (PGNCO5)-1; CHED scholarship Prog -2; SIDA Scholarship Prog-2; PESO DRGOS- 1; CHED TDP-28; Tertiary Education Subsidy (TES) - 4; RA10612 -1; RA7687)merit- 6, OWWA 1)	5.00			5.00	
	100	Number of academic scholarship grantees	169	CSM has 169 academic scholars	5.00			5.00	
	40	Number of non- merit scholarship grantees	68	CSM has 68 non- merit scholarship grantees	5.00			5.00	
Licensure Performance	10%	Passing percentage above national passing rate	9.58%	Chemistry Board: 44.83% (National passing: 54.41%); Chemical Technician Licensure Exam: 82.22% (National passing: 77.83%), Top 2: Kenneth Cole Audential	4.00			4.00	
Relevant Employment	80%	Percentage of relevant employment of graduates	42%	18 out of 43 or 41.86% have relevant employment [Chemistry: 10 out of 17; Bio: 8 out of 26]	2.00	2.00		2.00	
Employment Rate	80%	Percentage of employed graduates	67%	29 out of 43 or 67.44% are employed [Chemistry: 17 out of 17; Bio: 12 out of 26]	2.00	2.00		2.00	

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Host training establishments	10	Number of agencies to forge partnership	16	1. HJO Resources Management Inc. 2. Bureau of Fisheries and Aquatic Resources Region 12 3. Euro-Generics International Philippines Foundation (EGIPP) 4. Regional Crop Protection Center (RCPC) – SOCCSKSARGEN XII 5. Alsos Agribusiness Unit, Sarangani 6. DENR-ENVIRONMENTAL MANAGEMENT BUREAU XII 7. LGU Cumbilio - MENRO 8. Crocodile Park, Davao City 9. Bone Museum, Davao City 10. Mindanao Doctors Hospital Cancer Center Inc. 11. DOLE Philippines Inc (Polomolok, South Cotabato) 12. MOST-BARMM Laboratory (Cotabato City) 13. Regional Forensic Unit (Region XI, Davao City) 14. University of the Philippines Mindanao (Lactic Acid Research Laboratory) 15. DENR Environment Management Bureau XII, Koronadal City 16. Philippine Science High School, SOCCSKSARGEN Region Campus, Koronadal City	5.00			5.00	
	40	Number of student trainees to deploy	93	Chem: 25, Bio: 68	5.00			5.00	
								-	
<b>a.1.2 Competent Faculty and Staff</b>									
Relevant professional development programs	10%	Percentage of faculty to pursue advanced and post-doctoral degrees	17.65%	6 out of 34 or 17.65% faculty pursue advanced studies [Basay, Gonzaga, Sorupia, Garcia, Mamon, Galas]	5.00			5.00	
	50%	Percentage of faculty with relevant trainings and seminars	92.00%	46 out of 50 or 92% have relevant trainings and seminars [Chem: 7, Physics: 6, Math: 19; Bio 14]	3.00			3.00	
Rationalize faculty teaching load	100%	Percentage of faculty with normal teaching load	30.91%	17 out of 55 or 30.91% have normal load	3.00			3.00	
	0%	percentage of faculty with overload	69.09%	38 out of 55 or 69.09% have overload. 33 out of 38 or 86.84% of faculty with overload were partially attributed to student factor	3.00			3.00	
	1:30	Faculty student ratio	1 is to 50	1:50	5.00	5.00	5.00	5.00	

 <b>UNIVERSITY OF SOUTHERN MINDANAO</b> Kabacan, Cotabato Philippines 									
<b>a.1.3 Curriculum alignment with statutory and regulatory agencies</b>									
Program Accreditation	100%	Percentage of programs due for COPC	100%	All 4 programs were subjected to COPC	5.00			5.00	
	100%	Percentage of accredited programs	100%	2 programs are accredited, while all other programs are new	5.00			5.00	
COD/ COE	1	Number of Programs to sustain COE/COD	1	Sustained COD of Biological Sciences Department	5.00			5.00	
	1	Number of institutional accreditation to maintain (PQA)	2	USM is PQA accredited; CSM is ISO certified	5.00			5.00	
Curricula harmonization	n/a	Number of programs to harmonize with other SUCs in the region	n/a					-	
	4	Number of stakeholders to involve in curriculum design	5	Students, faculty, alumni, industry, parents were involved in curriculum design	5.00			5.00	
<b>b. Research</b>	<b>10%</b>				0.48	-	-	0.48	
RDEI engagement and capacitation of Faculty	40%	Percentage (number)of full-pledged professor to actively engage in RDEI	100%	7 out of 7 CSM full pledged professors are actively engaged: Tandog, Pimentel, Garcia EM, Pascual, Nones, Verzosa, Cabasan	5.00			5.00	
	40%	Percentage (number) of associate professors and below to actively engage in RDEI	88.63%	39 out of 44or 88.63% are actively engaged in RDEI [Physics 5, Chem 8, Bio 16, Math 10 ]	5.00			5.00	
	10	Number of seminars,workshops and trainings to attend	39	Attended a total of 39 seminars/workshops/trainings	5.00			5.00	
Scientific and Technical Publication	1	Number of articles to publish by students in legitimate peer-reviewed publications	5	Published 5 articles in legitimate peer-reviewed publications (by students)	5.00			5.00	
	40	Number of students research proposals to review	93	93 thesis outline were indexed	4.00			4.00	
Enhancement of Research Capability of students	40	Number of quality thesis outline manuscript to approve	160	160 thesis manuscripts were indexed	4.00			4.00	
	1	Number of students to involve in funded research projects and RDI center	12	6 students were involved in funded research projects: Chem: 6; Bio 6	5.00			5.00	
Intensify IP assests of the University	1	Number of trainings in IP protection and licensing to attend	9	6 CSM faculty were involved in trainings in IP protection and licensing: Chem: 4; Math 2; Bio 3	5.00			5.00	
<b>c. Extension</b>	<b>5%</b>				0.25	-	-	0.25	
Capacitation on community engagement	5	Number of students to capacitate in community engagement capability building activities	11	11 students were capacitated in community engagement capability building activities : Chem: 4; Bio 7	5			5.00	

 <b>UNIVERSITY OF SOUTHERN MINDANAO</b> Kabacan, Cotabato Philippines 									
	5	Number of students to involve in community engagement	11	11 students were involved in community engagement [Chem: 4; Bio 7]	5			5.00	
<b>d. Production</b>					0.00	-	-	0.00	
	1	Number of students to utilize techno-demo hub	4	4 students: utilized techno-demo hub : Chem: 4; Bio:	5			5.00	
<b>2. Administrative Management</b>	<b>5%</b>				0.25	0.23	-	0.25	
<b>a. Innovative and Sustainable Governance Ecosystem</b>									
Alignment of Individual and Unit objectives to USM Strategic goals	1	Number of strategic plan to formulate and review	1	Formulated and reviewed 1 strategic plan for CSM	5.00			5.00	
	1	Number of operational plan to craft	1	Formulated and reviewed 1 operational plan for CSM	5.00			5.00	
	56	Number of subordinates' IPCR to evaluate	56	Evaluated all submitted IPCRs	5.00			5.00	
VOC system	n/a	Percentage of utilization of VOC information system	n/a					-	
Effective and Efficient delivery of service	n/a	Percentage of processes/ procedures to update/ revise	n/a					-	
	n/a	Number of new processes, procedures and policy to enroll	n/a					-	
Expedite administrative and Financial Transactions	3	Number of digital platforms to utilize for administrative transactions	5	Utilized eDTR, DocTrack, RDEIS, Marka, and SAR	5.00	5.00		5.00	
	1	Number of digital platforms to utilize for financial transactions	1	Utilized the DocTrack for PR	5.00	4.00		4.50	
	100%	Percentage of administrative transactons through digital platforms	100%	All mandated administrative digital platforms were utilized.	5.00			5.00	
	100%	Percentage of financial transactions through digital platforms	100%	All mandated financial transaction through digital platforms were utilized.	5.00			5.00	
Strengthened compliance on policies governing government workers		Fund Utilization						-	
	50 percent	Fund 01		n/a				-	
	50 percent	Fund 05		n/a				-	
	n/a	Fund 06		n/a				-	
Digital transformation	100%	Percentage of Information system to utilize	100%	All mandated information systems were utilized.	5.00	5.00		5.00	
<b>3. Support and other functions</b>	<b>10%</b>							<b>0.50</b>	
<b>a. Communication/Coordination</b>	<b>4%</b>				0.20	0.20	-	0.20	
a. Number of meetings conducted	4		13	Conducted a total of 13 meetings.	5			5.00	
b. Action to communications	100%		100%	Acted all communications.	5	5		5.00	

UNIVERSITY OF SOUTHERN MINDANAO Kabacan, Cotabato Philippines				  Management Review RMC 8009-2019		
c. Other Committee Membership	40%	34 out of 50	68%	<p>5 members of DAC: Anne, Porfirio, Cherie, Crommel, Entera (DAC TWG);</p> <p>5 Research and Extension in-House review committee: Daryl, Gelo, Krizler, Cherie, Manceras;</p> <p>2 members of IACUC: Lothy, Cyrelle,</p> <p>2 member of Univ Ethics: Lothy, Lyda;</p> <p>3 Curr Review: Meriam, May, Tesie;</p> <p>10 ISO: Bryan, May, Elen, Rowel, Roel, Philip, Lothy, Estrel, Benedict, Quennie;</p> <p>3 IM Development Committee members: Valle, Lothy, Gelo</p> <p>1 Guidance: Renee Jane</p> <p>1 Alumni: Sedra</p> <p>1 Socio-cultural : Roel</p> <p>GS Stat Curriculum Committee: Daryl, Anne, Jonald;</p> <p>Honors Committee: Ronald, Jupiter;</p> <p>Sports: Maganaka;</p> <p>Admission officers: Vallescas, Meriam, Sandra, Maganaka;</p> <p>UTDC Test Specialist: Manceras, Verzosa, Tandog, Bretana</p> <p>Bai Matabay Plang Floral Offering: Benjamin, Rubio, Ele, Sedra, Husain, Nanding</p> <p>Faculty association: Casim, Candari, Pimentel</p> <p>SIPARK: Tanalgo, Ele, Agdama, Verzosa</p> <p>Program Committee (Herona Day and Founders Day), Accommodation Committee, Usherette, Invitation Committee member, October 1, 2024 - Meriam M. Rubio</p> <p>Facilitator-Introduction of Speaker -Building Resilience in the Face of Stress, Anxiety and Depression: Strategies for Mental Strength &amp; Well-Being, November 22, 2024 - Renee Jane A. Ele</p> <p>Facilitator: CSM Orientation Program, August</p> <p>Student in house review judge/Facilitator: (ma pedrona, debbie, rowel, philip, amancio)</p> <p>Adviser of student orgs: (Annel, Jupiter, Leonard, Anna Jean, Marivic, Abigail, Elena, Amancio, Subsuban, Rufino);</p> <p>Coach: Crommel, SIMMODE Coach USA-Paleta, Volleyball coach: Maganaka</p> <p>Facilitator Career Guidance: Jane</p> <p>Coach:</p> <p>PhMlo Individual Category Virtual Eliminations November 2, 2024 - Crommel, Susan</p> <p>Adviser of student orgs: Bona Abigail Husain (BIOLUB&amp;EnvSci); Elen Tanabe (MICROSOC); Leonard Paleta (Applied Math Soc); Quennie Rufino (ChemSci)</p> <p>Nonesa-Philippine Physics Olympiad</p> <p>Valle, Valenton, Madio, Pilongo-Philippine Statistics Quiz</p> <p>70th Founding anniversary-All CSM faculty</p> <p>Pilongo-Judge of Matalam Travlogue Competition</p>	5	5.00
Adviser/Trainer/Coach/ d. Coordinator/Facilitator/Judge/ Performer/Panelist and the likes.	40%		100%	<p>Student in house review judge/Facilitator: (ma pedrona, debbie, rowel, philip, amancio)</p> <p>Adviser of student orgs: (Annel, Jupiter, Leonard, Anna Jean, Marivic, Abigail, Elena, Amancio, Subsuban, Rufino);</p> <p>Coach: Crommel, SIMMODE Coach USA-Paleta, Volleyball coach: Maganaka</p> <p>Facilitator Career Guidance: Jane</p> <p>Coach:</p> <p>PhMlo Individual Category Virtual Eliminations November 2, 2024 - Crommel, Susan</p> <p>Adviser of student orgs: Bona Abigail Husain (BIOLUB&amp;EnvSci); Elen Tanabe (MICROSOC); Leonard Paleta (Applied Math Soc); Quennie Rufino (ChemSci)</p> <p>Nonesa-Philippine Physics Olympiad</p> <p>Valle, Valenton, Madio, Pilongo-Philippine Statistics Quiz</p> <p>70th Founding anniversary-All CSM faculty</p> <p>Pilongo-Judge of Matalam Travlogue Competition</p>	5	5.00
b. Commitment & Purpose	4%				0.20	0.20

		<b>UNIVERSITY OF SOUTHERN MINDANAO</b> Kabacan, Cotabato Philippines					
a. Attendance to University-wide activities (as defined)	100%		100%	Attended all university-wide activities.	5		5.00
b. Attendance to Unit Convocations & activities	100%		100%	Attended all CSM activities and scheduled Monday convocation.	5	5	5.00
c. Attendance to Unit meetings	100%		100%	Attended all unit meetings	5		5.00
d. Submission of required Documents (FDTR, OPCR, SALN, TOR, Training Certificates, PDS, training accomplishment report, CA Liquidation report, etc.)	100%		100%	All submitted required documents.	5	5	5.00
e. Observance to basic health protocols based on DOH and IATF protocols	100%		100%	Basic health protocols and 75 are observed in CSM	5	5	5.00
<b>4. Other Accomplishments</b>	<b>2%</b>				<b>0.10</b>	<b>-</b>	<b>0.10</b>
23 CSM faculty have publications to Scopus/WOS indexed or refereed journals							
USM CSM hosted the Philippine Physics Olympiad qualifying round in Region 12							
2 USM grads top Rmico exam as released by the Philippine Academy of Microbiology					5		5.00
CSM conducted the thesis writing and workflow seminar who benefited nearly 150 students from various departments							
CASAMA project empowers Columbio community through VCO and soap making							
Biology freshman bags gold in Mother Bai quiz							
Math&Stat Dept and Graduate School empower elementary teachers with instructional materials development seminar-workshop in elementary math							
3 CSM students championed the Philippine Association of Chemistry Students (PASCMIN) Mindanao Quiz held at Cagayan De Oro City							
CSM Faculty Prof. Ronald Pascual together with 3 others from CBDEM bag gold medals in National Agribusiness Mentorship Series							
National Award, PASUC--- StatSelect							
2nd Place, Competition Segment-Core Process of Statistics, UP Diliman sponsored by UP Stat Society							
12 Biology students received Awards (Publication, Best Thesis, Best Paper presentation in Institutional and National level, Outstanding Student, Leadership Award)							
Tanalgo, KC - Dr Elvira O. Tan Award for Research Excellence in Natural Resources awarded by The Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)							
(other accomplishments are in the csm annual report)							
<b>Final Average Rating</b>	<b>100%</b>						<b>4.25</b>





UNIVERSITY OF SOUTHERN MINDANAO  
KABACAN, COTABATO

Bachelor of Science in Applied Mathematics  
CURRICULUM MAP

Level	Semester	Course Code	Course Title	PROGRAM OUTCOMES																			
				a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.
Year	Secd. Semester	PE 02	PATHFit 2: Exercise-based Fitness Activities	I	P	I	I	I															
		NSTP 02	Civic Welfare Training Service 2/Reserved Officers Training Corps 2			P	P	P															
	Midyear	GEMST 03	Living in the IT Era																				
		AMath 03	Calculus III							I											I		
	First Semester	GE 05	Purposive Communication		I																		
		GE 06	Art Appreciation		I			I															
		GE 07	Science, Technology and Society	I			P																
		AMath 10	Probability							I	P		I			I				I	I	P	P
		AMath 12	Advanced Calculus I																		P	P	P
		AMath 15	Operations Research I	D		D	P						P							P	P	P	P
		AMath 11	Discrete Mathematics			I											I			P	P	P	P
		PE 03	PATHFit 3: Menu of Dance, Sports, Martial Arts, Group Exercises, Outdoor and Adventure Activities		P	I	I	I															
	Year	GE 09	The Life and Works of Rizal					P															



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				a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.
2nd	Second Semester	ChemSci 02	General Chemistry							I						P	I	I					
		AMath 08	Differential Equations I							P		P								I	P		
		AMath 17	Mathematical Modeling			P		P		D	P				I	I					P	I	
		AMath Elec 01	Graph Theory and Applications	P		P										I					P	I	P
		AMath Elec 04	Applied Multivariate Analysis									P					P	P	P	P			P
		AMath Elec 02	Time Series Analysis							P	P					P	P	P	P	P			P
	Midyear	PE 04	PATHFit 4: Menu of Dance, Sports, Martial Arts, Group Exercises, Outdoor and Adventure Activities	I	P		I	I															
		AMath Elec 06	Categorical Data Analysis									P						P			P		
		GE 08	Ethics	P			I																
First Semester	First Semester	AMath BioSci 01	General Biology							I						P	I	I					
		AMath 14	Numerical Analysis													P					P		
		AMath Elec 03	Real Analysis																		P		P
		GEAH 02	Philippine Popular Culture																				
		AMath Elec 07	Item Response Theory					P													P		I
		AMath UT 01	Undergraduate Thesis I	D	D		D	D	D		D	D	D	D	P	D	D	P		P	D		P



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KABACAN, COTABATO

Bachelor of Science in Applied Mathematics  
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				a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	
3rd Year	Second Semester																									
		AMath 16	Theory of Interest												I						P					
		AMath 13	Statistical Theory			P			P		P				P	I		I	I							
		AMath Elec 05	Mathematical Biology			P				D		P			P	P	P		P	P	P				P	
		AMath UT 02	Undergraduate Thesis II	D	D		D	D	D		D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
SUMMARY				8	3	6	9	7		8	1		1	3	1	5	5	5	1	4	6	2	1	1	2	
				3	3	6	3	4	1	2	7	5	1	1	2	8	3	2	2	3	16	2	8	8	4	
				3	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	2	2	1	1	1	1

-Sample syllabus reflecting alignment to VMGO

UNIVERSITY OF SOUTHERN MINDANAO

COURSE SYLLABUS for CALCULUS 3

Course Number: MATH 213b Rev. No. 0 Page 1 of 12

EFFECTIVE DATE	REV. NO.	REVISION TYPE	CHANGE DESCRIPTION	PAGE AFFECTED	ORIGINATOR
August 16, 2021	0	New	Newly established compressed syllabus for BS Applied Mathematics program for use during COVID-19 Pandemic. Flexible mode of instruction is adapted.	ALL	Philip Lester P. Benjamin

ELECTRONICALLY RELEASED

2021.12.17

UNCONTROLLED

Author:	Reviewer:	Verifier:	Validator:	Final Approver:	BCC USE ONLY
PHILIP LESTER P. BENJAMIN, PhD Course Developer Date: 2021.07.19	Engr. ARNEL B. TOLEDO Subject Expert Date: 2021.07.02	LEONARD M. PALETA, PhD Department Head Date: 2021.05.07	JONALD L. PIMENTEL, PhD CSM Dean Date: 2021.05.05	CONSUELO A. TAGARO, EdD Vice President for Academic Affairs Date: 2021.05.04	DOCUMENT CONTROL INDICATOR MASTER COPY

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USM-EDU-Fas-Rev. 2020.1.18



UNIVERSITY OF SOUTHERN MINDANAO				
Course Number	MATH 213b	Course Title	Calculus 3	Rev. No. 0 Page 2 of 10

#### INSTITUTIONAL POLICIES

Vision	Quality and relevant education for its clientele to be globally competitive, culture sensitive and morally responsive human resources for sustainable development.
Mission	Help accelerate socio-economic development <sup>SM</sup> , promote harmony among the diverse cultures <sup>SM</sup> and improve quality of life <sup>SM</sup> through instruction, research, extension and resource generation in Southern Philippines.
Core Values	G-Goodness, R-Responsiveness, E-Excellence, A-Assertion of Right and Truth
USM Quality Policy Statement	<p>The University of Southern Mindanao, as a premier university, is committed to provide quality instruction, research development and extension services and resource generation that exceed stakeholders' expectations through the management of continual improvement efforts on the following initiatives.</p> <ol style="list-style-type: none"><li>1. Establish key result areas and performance indicators across all mandated functions;</li><li>2. Implement quality educational programs;</li><li>3. Guarantee competent educational service providers;</li><li>4. Spearhead need-based research outputs for commercialization, publication, patenting, and develop technologies for food security, climate change mitigation and improvement in the quality of life;</li><li>5. Facilitate transfer of technologies generated from research to the community for sustainable development;</li><li>6. Strengthen relationship with stakeholders;</li><li>7. Sustain good governance and culture, sensitivity; and</li><li>8. Comply with customer, regulatory and statutory requirements.</li></ol>
Goals of the College	<ol style="list-style-type: none"><li>1. The College of Science and Mathematics of the University of Southern Mindanao is committed to the comprehensive preparation of the next generation of scientists and mathematicians in this part of the country.</li><li>2. The College supplies a condition in which faculty can advance and support high-quality research programs in which students can collaborate and contribute to new knowledge that improves quality of life.</li><li>3. The College aspires to be the center of excellence in Science and Mathematics in order to serve diverse students, preparing them for their future careers in line with the vision and mission of the University.</li><li>4. The College serves the community and the industry as an impartial source of quality graduates in Science and Mathematics that provides education, literacy, innovation and solution generation to challenges.</li></ol>
Department Objectives	The Department of Mathematics and Statistics aims to: 1. produce students with mastery in the core areas of mathematics and statistics, including algebra, analysis, and geometry; 2. develop students' skills in pattern recognition, generalization, abstraction, critical analysis, synthesis, problem-solving and rigorous argument; 3. express an enhanced perception of the vitality and importance of mathematics in the modern world including inter-relationships within math and its connection to other disciplines; and 4. develop students' skills in creating and evaluating mathematical conjectures and arguments, and in validating their own mathematical thinking.



UNIVERSITY OF SOUTHERN MINDANAO				
Course Number	MATH 213b	Course Title	Calculus 3	Rev No 0 Page 3 of 12

PROGRAM INFORMATION				
Degree Program	Bachelor of Science in Applied Mathematics	CHED CMO Reference	48 Series of 2017	BOR Approval BOR Resolution no. 24 s. 2020

COURSE DETAILS				
Course Title	Calculus 3			
Course Number	MATH 213b	Curriculum Component	Core Subject	
Credit (Unit)	3 Units	LECTURE (Unit-Hours)	3 Units - 3 Hours	LABORATORY (Unit-Hours) 0 Units - 0 Hours
Prerequisites	MATH 122b	Co-requisites	None	Year Level/Semester Offered 2nd Year - First Semester
Course Description	This course discusses application of integration, techniques of integration, sequences and series, and power series.			
Faculty in charge				
Consultation Hours	Contact Information			

PROGRAM EDUCATIONAL OBJECTIVES (PEO)		MISSION		
		M1	M2	M3
In 3-5 years, the BSAM graduates of USM shall:				
PEO 1	Provide leadership in various development programs both public and private	✓		
PEO 2	Equip with technical, conceptual and human resource skills	✓		✓
PEO 3	Pursue entrepreneurial activities	✓		✓
PEO 4	Able to adapt to diverse culture		✓	
PEO 5	Pursue advanced studies in emerging related fields		✓	✓

The PEOs are based on the professional, industry, local, national and international needs and requirements of the program identified through consultation with constituents and stakeholders.





UNIVERSITY OF SOUTHERN MINDANAO					
Course Number	MATH 213b	Course Title	Calculus 3	Rev. No.	0
				Page 4 of 12	

PROGRAM OUTCOMES (PO)

Upon graduation, the University of Southern Mindanao BSAM students must be able to:


	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6	PEO7	PEO8	PEO9	PEO10
a.) Articulate and discuss the latest development in the specific field of practice.		✓								
b.) Effectively communicate orally and in writing using both English and Filipino		✓								
c.) Work effectively and independently in multidisciplinary and multi-cultural teams.			✓	✓						
d.) Act in recognition of professional, social and ethical responsibility										
e.) Preserve and promote "Filipino historical and cultural heritage"	✓									
f.) Participate in the generation of new knowledge in research and development projects.		✓								
g.) Demonstrate broad and coherent knowledge and understanding in the core areas of physical and natural sciences.		✓								
h.) Apply critical and problem solving skills using the scientific method.		✓								
i.) Interpret relevant scientific data and make judgements that include reflection on relevant scientific and ethical issues.	✓									
j.) Carry out basic mathematical and statistical computations and use appropriate technologies in the analysis of data.		✓		✓						
k.) Communicate information, ideas, problems, and solutions, both orally and in writing, to other scientists, decision makers, and the public.	✓	✓	✓	✓						
l.) Relate science and mathematics to the other disciplines.		✓	✓	✓						
m.) Design and perform safe and responsible techniques and procedures in laboratory or field practices.		✓								
n.) Critically evaluate input from others.		✓		✓						
o.) Appreciate the limitations and implications of science in everyday life.		✓								
p.) Commit to the integrity of data.		✓		✓						
q.) Gain mastery in the core areas of mathematics: algebra, analysis, and geometry.		✓		✓						
r.) Demonstrate skills in pattern recognition, generalization, abstraction, critical analysis, synthesis, problem-solving and rigorous argument.		✓								
s.) Develop an enhanced perception of the vitality and importance of mathematics in the modern world including inter-relationships within math and its connection to other disciplines.		✓		✓						
t.) Appreciate the concept and role of proof and reasoning and demonstrate knowledge in reading and writing mathematical proofs.		✓								
u.) Make and evaluate mathematical conjectures and arguments and validate their own mathematical thinking.		✓		✓						
v.) Communicate mathematical ideas orally and in writing using clear and precise language.	✓	✓								

NOTE: Minimum PO's shall come from the PSG/CMO of the program if applicable. Other additional PO's may come from consultations with constituents and stakeholders.

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UNIVERSITY OF SOUTHERN MINDANAO

Course Number

MATH 213b

Course Title

Calculus 3

Rev. No.

8

Page 5 of 12

COURSE OUTCOMES (CO)

Upon passing this course, the students must be able to:

Course Alignment to Program Outcomes

	POa	POb	POc	POd	POe	POf	POg	POh	POi	POj	POk	POl	POm	POn	POo	POp	POq	POr	POs	POt	POu	POv	POw	POx	POy	POz
CO 1 Solve problems involving areas of regions and volumes of solids of revolution.					E	E	E	E	E	E					E	E	E									
CO 2 Solve problems involving areas of regions, volumes of solids of revolution, arc lengths of curve and differential equations.					E	E	E	E	E	E					E	E	E									
CO 3 Evaluate integrals using basic integration techniques.					E	E	E	E	E	E					E	E	E									
CO 4 Apply various tests for convergence and divergence of series.					E	E	E	E	E	E					E	E	E									
CO 5 Obtain the radius and interval of convergence of power series.					E	E	E	E	E	E					E	E	E									
CO 6																										
CO 7																										
CO 8																										

\* Level (follow the legend, used in the most relevant PSG/CMO)

[I] = Introductory. This introduces the student to the Program Outcome (PO).

[E] = Enabling. This enables the student to attain the Program Outcome (PO).

[D] = Demonstrative. This demonstrates the student's attainment of the Program Outcome (PO).

Level (follow the legend used in the most relevant PSG/CMO)

[I] = Introductory. This introduces the student to the Program Outcome (PO).

[E] = Enabling. This enables the student to attain the Program Outcome (PO).

[D] = Demonstrative. This demonstrates the student's attainment of the Program Outcome (PO).

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UNIVERSITY OF SOUTHERN MINDANAO						
Course Number	MATH 213b	Course Title	Calculus 3	Rev. No.	8	Page 6 of 12

COURSE LEARNING PLAN								
Intended Learning Outcomes (ILO) By the end of the learning experience*, students must be able to:	Aligned to CO:	Time Frame (Week)	Course Content (Topics)	Teaching & Learning Activities (TLA)		Learning Materials	Assessment Tasks (AT)	Suggested Readings
				Teaching Activities	Learning Activities			
<ul style="list-style-type: none"><li>Explain the vision, mission, UOPS of the University</li><li>Explain the goals and objectives of the college.</li><li>Explain the Program Educational Objectives, Students Outcomes, and Course Outcomes.</li></ul>		1	Orientation on Classroom and University Policies as well as Grading System <ul style="list-style-type: none"><li>Discussion on PEO, SO and CO</li></ul>	Orientation, Lecture/Discussion	Reading, Assignment, USM VLE	Computer, Powerpoint presentation, Laptop/PC	Recitation	[1]
<ul style="list-style-type: none"><li>Determine the area of a region between two curves by integrating with respect to the independent variable.</li><li>Find the area of a compound region.</li><li>Determine the area of a region between two curves by integrating with respect to the dependent variable.</li></ul>	CO1	1-2	Applications of Integration <ul style="list-style-type: none"><li>Areas between curves</li></ul>	Lecture/ Video Presentation Zoom video conference Module	Discussion Seat work Group Reporting USM VLE tasks	Whiteboard Book (in PDF) Workbook Projector Laptop/PC Powerpoint presentation	Quizzes Exams Seatworks Reports/ Reflective paper USM VLE Exercises	[2] [3] [4] [5] [6] [7] [8] [9] [10]
<ul style="list-style-type: none"><li>Determine the volume of a solid by integrating a cross-section (the slicing method).</li><li>Find the volume of a solid of revolution using the disk method.</li><li>Find the volume of a solid of</li></ul>	CO1	3	Applications of Integration <ul style="list-style-type: none"><li>Determining Volumes by Slicing</li></ul>	Lecture/ Video Presentation Zoom video conference Module	Discussion Seat work Group Reporting USM VLE tasks	Whiteboard Book (in PDF) Workbook Projector Laptop/PC Powerpoint presentation	Quizzes Exams Seatworks Reports/ Reflective paper USM VLE Exercises	[1] [2] [3] [4] [5] [6] [7] [8]

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USM-EDU-FOS-Rev4, 10-00-1-18

UNIVERSITY OF SOUTHERN MINDANAO										
Course Number	MATH 233b	Course Title			Calculus 3			Rev No	0	Page 1 of 12
revolution with a cavity using the washer method.										(9) (10)
<ul style="list-style-type: none"><li>Calculate the volume of a solid of revolution by using the method of cylindrical shells.</li><li>Compare the different methods for calculating a volume of revolution</li></ul>	CO1	4	<b>Applications of Integration</b> <ul style="list-style-type: none"><li>Volumes of Revolution: Cylindrical Shells</li></ul>	Lecture/ Video Presentation Zoom video conference Module	Discussion Seat work Group Reporting USM VLE tasks	Whiteboard Book (in PDF) Workbook Projector Laptop/PC Powerpoint presentation	Quizzes Exams Seatworks Reports/ Reflective paper USM VLE Exercises		(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)	
<ul style="list-style-type: none"><li>Recognize when to use integration by parts.</li><li>Use the integration-by-parts formula to solve integration problems.</li><li>Use the integration-by-parts formula for definite integrals</li></ul>	CO 2	5	<b>Techniques of Integration</b> <ul style="list-style-type: none"><li>Integration by Parts</li></ul>	Lecture/ Video Presentation Zoom video conference Module	Discussion Board work Seat work Group Reporting USM VLE/ MyOpenMath Tasks	Chalkboard/ Whiteboard Book PDF Workbook Projector Laptop/PC Powerpoint presentation	Quizzes Exams Seatworks Reports/ Reflective paper USM VLE Exercises		(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)	
<ul style="list-style-type: none"><li>Solve integration problems involving products and powers of sine and cosine</li><li>Solve integration problems involving products and powers of tangent and secant</li><li>Use reduction formulas to solve trigonometric integrals</li></ul>	CO 2	6	<b>Techniques of Integration</b> <ul style="list-style-type: none"><li>Trigonometric Integrals</li></ul>	Lecture/ Video Presentation Zoom video conference Module	Discussion Board work Seat work Group Reporting USM VLE/ MyOpenMath Tasks	Chalkboard/ Whiteboard Book PDF Workbook Projector Laptop/PC Powerpoint presentation	Quizzes Exams Seatworks Reports/ Reflective paper USM VLE Exercises		(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)	

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UNIVERSITY OF SOUTHERN MINDANAO

Course Number	MATH 233b	Course Title	Calculus 3		Rev No	0	Page 8 of 12
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<ul style="list-style-type: none"><li>Solve integration problems involving the square root of a sum or difference of two squares. Integrate a rational function using the method of partial fractions.</li><li>Recognize simple linear factors in a rational function.</li><li>Recognize repeated linear factors in a rational function.</li><li>Recognize quadratic factors in a rational function</li></ul>	CO 2	7-8	<b>Techniques of Integration</b> <ul style="list-style-type: none"><li>Trigonometric Substitution</li><li>Partial Fractions</li><li>Improper Integrals</li></ul>	Lecture/Video Presentation Zoom video conference Module	Discussion Board work Seat work Group Reporting USM VLE/ MyOpenMath Tasks	Chalkboard/ Whiteboard Book PDF Workbook Projector Laptop/PC Powerpoint presentation	Quizzes Exams Seatworks Reports/ Reflective paper USM VLE Exercises	(1) (3) (4) (5) (6) (7) (8) (9) (10)
<b>MIDTERM EXAM</b>	3	9	<b>MIDTERM EXAM</b>					
<ul style="list-style-type: none"><li>Find the formula for the general term of a sequence.</li><li>Calculate the limit of a sequence if it exists.</li><li>Determine the convergence or divergence of a given sequence.</li><li>Explain the meaning of the sum of an infinite series.</li><li>Calculate the sum of a geometric series.</li><li>Evaluate a telescoping series.</li></ul>	CO3	11-12	<b>Sequences and Series</b> <ul style="list-style-type: none"><li>Sequences</li><li>Infinite Series</li></ul>	Lecture/Video Presentation Zoom video conference Module	Discussion Seat work Group Reporting USM VLE tasks	Whiteboard Book (in PDF) Workbook Projector Laptop/PC Powerpoint presentation	Quizzes Exams Seatworks Reports/ Reflective paper USM VLE Exercises	(1) (3) (4) (5) (6) (7) (8) (9) (10)

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USM-EDU-FOS-Rev. 2020.2.18

UNIVERSITY OF SOUTHERN MINDANAO									
Course Number	MATH 213b	Course Title	Calculus 3				Rev. No.	Q	Page 9 of 12
<ul style="list-style-type: none"><li>Use the divergence test to determine whether a series converges or diverges.</li><li>Use the integral test to determine the convergence of a series.</li><li>Estimate the value of a series by finding bounds on its remainder term.</li><li>Use the comparison test to test a series for convergence.</li><li>Use the limit comparison test to determine convergence of a series.</li></ul>	CO3	13	<b>Sequences and Series</b> <ul style="list-style-type: none"><li>The Divergence and Integral Tests</li><li>Comparison Test</li></ul>	Lecture/ Video Presentation Zoom video conference Module	Discussion Seat work Group Reporting USM VLE tasks	Whiteboard Book (in PDF) Workbook Projector Laptop/PC Powerpoint presentation	Quizzes Exams Seatworks Reports/ Reflective paper USM VLE Exercises	[2] [3] [4] [5] [6] [7] [8] [9] [10]	
<ul style="list-style-type: none"><li>Use the alternating series test to test an alternating series for convergence.</li><li>Estimate the sum of an alternating series.</li><li>Explain the meaning of absolute convergence and conditional convergence.</li><li>Use the ratio test to determine absolute convergence of a series.</li><li>Use the root test to determine absolute convergence of a series.</li><li>Describe a strategy for testing the convergence of a given series.</li></ul>	CO3	14	<b>Sequences and Series</b> <ul style="list-style-type: none"><li>Alternating Series</li><li>Ratio and Root Test</li></ul>	Lecture/ Video Presentation Zoom video conference Module	Discussion Seat work Group Reporting USM VLE tasks	Whiteboard Book (in PDF) Workbook Projector Laptop/PC Powerpoint presentation	Quizzes Exams Seatworks Reports/ Reflective paper USM VLE Exercises	[2] [3] [4] [5] [6] [7] [8] [9] [10]	

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USM-EDU-F05-Rev4, 2020.2.18

UNIVERSITY OF SOUTHERN MINDANAO

Course Number

MATH 213b

Course Title

Calculus 3

Rev. No.

Q

Page 10 of 12

- Identify a power series and provide examples of them.
- Determine the radius of convergence and interval of convergence of a power series.
- Use a power series to represent a function.
- Combine power series by addition or subtraction.
- Create a new power series by multiplication by a power of the variable or a constant, or by substitution.
- Multiply two power series together.
- Differentiate and integrate power series term-by-term.

CO 4

15

Power Series

- Properties of Power Series

Lecture/  
Video  
Presentation  
Zoom video conference  
Module

Discussion  
Board work  
Seat work  
Group Reporting  
USM VLE/  
MyOpenMath Tasks

Chalkboard/  
Whiteboard  
Book  
PDF  
Workbook  
Projector  
Laptop/PC  
Powerpoint  
presentation

Quizzes  
Exams  
Seatworks  
Reports/  
Reflective paper  
USM VLE Exercises

[2]  
[3]  
[4]  
[5]  
[6]  
[7]  
[8]  
[9]  
[10]

- Describe the procedure for finding a Taylor polynomial of a given order for a function.
- Explain the meaning and significance of Taylor's theorem with remainder.
- Estimate the remainder for a Taylor series approximation of a given function.

CO 4

16-17

Power Series  
Taylor and Maclaurin  
Series

Lecture/  
Video  
Presentation  
Zoom video conference  
Module

Discussion  
Board work  
Seat work  
Group Reporting  
USM VLE/  
MyOpenMath Tasks

Chalkboard/  
Whiteboard  
Book  
PDF  
Workbook  
Projector  
Laptop/PC  
Powerpoint  
presentation

Quizzes  
Exams  
Seatworks  
Reports/  
Reflective paper  
USM VLE Exercises

[2]  
[3]  
[4]  
[5]  
[6]  
[7]  
[8]  
[9]  
[10]

All ILOs covered in the Course

4

18

FINAL EXAMINATION

\* any interaction, course, program, or other experience in which learning takes place (<https://www.edulibrary.org/learning-experience/>).

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USM-EDU-F05-Rev4, 2020.2.18

Course Number	MATH 233b	Course Title	Calculus 3	Rev. No.	0	Page 12 of 12
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[1] USM Student Manual

[2] Anton, H., Bivens, I.C., and Davis, S., Calculus Early Transcendentals, 10<sup>th</sup> Edition, Wiley, 2011.

[3] Anton, H., Bivens, I.C., and Davis, S., Calculus, 10<sup>th</sup> Edition, Wiley, 2012.

[4] Edwards, Jr., C.H. and Davis, S., Calculus, Early Transcendentals, 7<sup>th</sup> Edition, Prentice Hall, 2007.

[5] Etgen, G., S. Salas and E. Hille, Calculus: One and Several Variables, 9<sup>th</sup> Edition, John Wiley and Sons, Inc., 2009.

[6] Leithold, Louis, The Calculus 7, Harper Collins, 1996.

[7] Stewart, J., Calculus: Early Transcendentals, 7<sup>th</sup> Edition, Brooks/Cole, 2011.

[8] Thomas, G.B., Weir, M.D. and Hass, J.L., Thomas' Calculus, 12<sup>th</sup> Edition, Pearson, 2009.

[9] Thomas, G.B., Weir, M.D. and Hass, J.L., Thomas' Calculus Early Transcendentals, 1<sup>st</sup> Edition, Pearson, 2006.

[10] Varberg, D., Purcell, E.J., and Rigdon, S.E., Calculus, 9<sup>th</sup> Edition, Pearson, 2006.

#### Textbook/References

#### Lifelong Learning Opportunity

The most common practical use of calculus is when plotting graphs of certain formula or functions. Among the disciplines that utilize calculus include physics, engineering, economics, statistics, and medicine. It is used to create mathematical models in order to arrive into an optimal solution.

#### Course Evaluation

Course Evaluation				
Course Outcome (CO)	Assessment Task/Activity/Exam	Weight (%)	Target Rating	Target (%)
CO 1: Solve problems involving areas of regions and volumes of solids of revolution.	Quizzes/Summative Exams	40	60	75% of the class obtained a satisfactory rating
	Major Exam	40		
	Assignments/Exercises	20		
CO 2: Solve problems involving areas of regions, volumes of solids of revolution, arc lengths of curve and differential equations.	Quizzes/Summative Exams	60	60	75% of the class obtained a satisfactory rating
	Major Exam	40		
	Assignments/Exercises	20		
CO 3: Evaluate integrals using basic integration techniques.	Quizzes/Summative Exams	60	60	75% of the class obtained a satisfactory rating
	Major Exam	40		
	Assignments/Exercises	20		
CO 4: Apply various tests for convergence and divergence of series.	Quizzes/Summative Exams	60	60	75% of the class obtained a satisfactory rating
	Major Exam	40		
	Assignments/Exercises	20		

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UNIVERSITY OF SOUTHERN MINDANAO			
Course Number	MATH 213b	Course Title	Calculus 3
Rev	10	Q	Page 10 of 22

Midterm Grade		Grading System	
Quizzes/Summative Exams	40%	Final Grade	
Midterm Exam/USM VLE Exam	40%	50% Midterm Grade + 50% Final Term Grade	
Assignments/Exercises	20%		
Final Term Grade		Passing Grade	60%
Quizzes/Summative Exams	40%		
Midterm Exam/USM VLE Exam	40%		
Assignments/Exercises	20%		

- Classroom Policies**
1. Come to class prepared for recitation, class discussions, or unannounced quizzes always. Demonstrate personal responsibility by obtaining notes and finding out any instructions/important announcements given on the class period missed.
  2. Absence is not a right, nor a privilege. The University Code on absence and tardiness applies 100% of the total class hours means you are DROPPED from the course. Absences can be excused only after presenting official documents.
  3. All submissions must be your original work. Cite sources properly. Plagiarism and any form of academic cheating get a corresponding grade of 5.0 (Failed) and can be grounds for suspension or expulsion.
  4. During online class, students are expected to:
    - a. Show up on a scheduled time and wait to be admitted into the class.
    - b. Be always respectful. If your video is on, avoid hand gestures or inappropriate language.
    - c. Stay on mute. Click a raise hand button if you have a question or something to share.
    - d. Stay focused and on task so you don't miss anything the speaker says.
    - e. Class participation is highly encouraged.
  5. Consultation: You can approach your class mayor for your concerns so he/she will relay them once to your professor
  6. All information and queries regarding our class will be posted in our official group chat or facebook group. Refrain from posting unrelated topics in these platforms as these will take up space in the messenger box and will make it difficult to backread important messages.
  7. Observe proper decorum when sending messages to your professors.
  8. Avoid sending messages online outside office hours or during evening.
  9. All submissions must be in USM VLE. Submissions made outside VLE will not be accepted.



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-List of student research with titles

Student thesis were also crafted based on USMs VMGO

**BACHELOR OF APPLIED MATHEMATICS RESEARCH  
(FIRST BATCH)**

AUTHOR	TITLE
1. Abdullatip, Amira Y.	Predicting Wins and Losses in Tournaments Using Various Rating Methods
2. Calawigan, MArgielyn C.	On the Calibration of Item Parameters of the University of Southern Mindanao - College Entrance Examination Using 2PL Model: A Case for English Items
3. Camano, Jolina A.	On the Calibration of Item Parameters of the University of Southern Mindanao - College Entrance Examination Using 2PL Model: A Case for Science Items
4. Campos, Florabelle L.	Domination in the Corona of Graphs
5. Kadil, Zahera S.	Analysis of Scoring Schemes for Multiple-Choice Examinations
6. Luwalhati, Orbista M.	Comparison of Newton's, Secant, Bisection, and Fixed-point Iteration Methods in the Solution of Non-Elementary Equations
7. Matulik, Jalandie T.	On the Calibration of Item Parameters Characteristics of the University of Southern Mindanao - College Entrance Exam Using 2PL Model: A Case for Mathematics Item
8. Piang, Fahad E.	Hop Domination in the Join of Graphs
9. Putong, Normaila M.	An Expository Study on the Panel Regression Modelling on Coffee Production Among The Top Five Producers in the Philippines
10. Sarip, Airah D.	
11. Toniacao, Mikee V.	Domination in the Join of Graphs
12. Tormis, Janna Fie A.	Domination in the Edge Corona of Graphs
13. Uti, Hamida K.	Item Parameter Calibrations of the USMCEE Using Two Parameter Logistics Model: A Case for Abstract Reasoning Items

**BACHELOR OF APPLIED MATHEMATICS RESEARCH  
(SECOND BATCH)**

AUTHOR	TITLE
1. Jongco, Roy D.	Forecasting the Farm Gate Prices of Dry Palay of Cotabato Provinces
2. Victoria, Desiree G.	Forecasting the Exchange Rates of US Dollar To Philippines Peso Using Arima Time Series Analysis
3. Llondra, Manuel A.	An Application of Kaplan-Meier Method and Cox Regression Model on the Post-Transplant Outcomes of Solitary and Multi-Organ Liver Transplantation
4. Lelis, Carl Ivan P.	The Effect of Option Homogeneity in the Item Difficulty Estimates on a Multiple-Choice Examination Under the Rasch Model
5. Maslamama, Norhata M.	Comparison of the Item Difficulty Estimates in the Mathematics in the Modern World Examination Using Different IRT Models
6. Cajutol, Darla C.	Exploring Normality Test Methodology with Secondary Data
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