March 21, 2014

DIVISION MEMORAMDUM
No. __171__ s. 2014

OFFERING OF SUMMER SHORT COURSES ON MATHEMATICS AND STATISTICS THAT WILL NEWLY BE OFFERED IN THE K TO 12 CURRICULUM

To   Assistant Superintendent/OIC
        Education Supervisors/Coordinators
        District Supervisors/OICs
        Secondary School Heads
        Heads, Private Secondary School

1.   Attached is a copy of Unnumbered Regional Memorandum, dated March 10, 2014, entitled, **OFFERING OF SUMMER SHORT COURSES ON MATHEMATICS AND STATISTICS THAT WILL NEWLY BE OFFERED IN THE K TO 12 CURRICULUM.**

2.   Immediate dissemination of this Memorandum is desired.

ARDEN D. MONISIT, Ed.D.
Schools Division Superintendent

MEMORANDUM

To: Schools Division Superintendents
Officers-in-Charge of Interim and Regular Schools Divisions

From: Dr. Carmelita T. Dulangon
Director III
Officer-in-Charge

Subject: **Offering of Summer Short Courses on Mathematics and Statistics that will newly be Offered in the K to 12 Curriculum**

Date: March 10, 2014

The Mathematics Program- Sciences Cluster of the University of the Philippines-Cebu would like to share their expertise to our secondary school teachers. Based on the K to 12 Curriculum Technical Panel in Mathematics and Statistics, they identified subjects in the tertiary level and these subjects are now offered in Grades 7-12 such as Basic Statistics, Probability, Analytic Geometry, Calculus, Logic and Linear Programming.

Attached herewith are copies of the proposal for the short courses in Mathematics and Statistics and the letter dated February 7, 2104 from Dr. Prof. Nelia S. Ereno, Chair of the Committee on 2014 Extension Projects of the Mathematics Program.

Wide dissemination and preferential attention of this Memorandum is desired.

CARMELITA T. DULANGON, Ed.D.
Director III
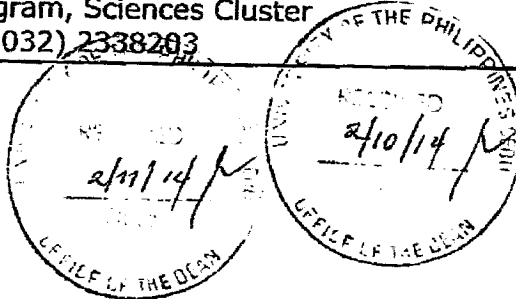Officer-in-Charge

CTD/ CCL/MPD/jksb

07 February, 2014

Dr. Carmelita P. Dulangon
OIC Regional Director
Department of Education - R7
Sudlon, Lahug Cebu City

Subject: *Offering of Summer Short Courses on Mathematics and Statistics that will newly be offered in the K to 12 Curriculum*

Dear Dr. Dulangon:

The Department of Education has started the K to 12 curriculum two years ago. With the inclusion of subjects in the tertiary level to the said K to 12 curriculum, we, in the tertiary level, would like to share our expertise to our secondary teachers. Based on the K to 12 Curriculum Technical Panel in Mathematics and Statistics copy of list, we identified the following subjects which used to be in the tertiary level but they are now in Grades 7-12: Basic Statistics, Probability, Analytic Geometry, Calculus, Logic and Linear Programming. We also detected that graphic calculator and softwares in Statistics will be used. Thus, we are submitting our proposal for short courses in Mathematics and Statistics. It will commence this coming April, 2014. Please see attached proposal.

Hope to hear from you soon.

Thank you very much!

Very truly yours,

Prof. NELIA S. ERENO
Chair, Committee on 2014 Extension Projects
    of the Math Program
UP Cebu

Endorsed:
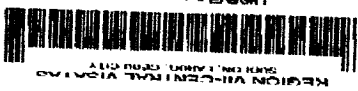
JONNIFER SINOGAYA, PhD
Chair, Sciences Cluster

LORNA ALMOCERA, PhD
Associate Dean for Academic Affairs

Atty LIZA D. CORRO

PROJECT PROPOSAL

A. Proponent: Mathematics and Statistics Faculty of UP Cebu

B. Short Courses on

  1. Basic Statistics
  2. Probability
  3. Analytic Geometry and Calculus
  4. Logic and Linear Programming
  5. Application Software and Software Packages

Please see the attached Course Syllabus.

C. Date of Implementation:

Batch 1:
  April 3 – 16, 2014 (except Sundays) – Logic & Linear Programming; Probability;
        Use of Statistical Packages and Softwares
  April 3 – 29, 2014 (except holidays and Sundays) – Analytic Geometry and Calculus, Basic Statistics

Batch 2:
  April 21 – May 6, 2014 (except holidays and Sundays)- Logic & Linear Programming; Probability
        Use of Statistical Packages and Softwares
  May 2 – 24, 2014 (except Sundays)– Analytic Geometry and Calculus, Basic Statistics

D. Venue: 2nd floor AS Building, UP Cebu

E. Total No. of Hours: 48 hours each course on Logic & Linear Programming,, Probability and Use of
        Statistical Packages and Softwares

  80 hours each course on Analytic Geometry and Calculus, Basic Statistics

F. Clients: Grade 7-12 teachers in Statistics and Mathematics of Negros Oriental

G. Number of Participants: minimum of 20 but maximum of 25 teachers per course per batch

H. Brief Rationale:

In AY 2012 - 2013, the Department of Education implemented the K to 12 Curriculum, which adds two years to the existing 10-year pre-university education. As a consequence, basic mathematics courses offered in the early years of the tertiary level are now made part of the course offerings in the new curriculum for basic education.

To prepare for the implementation of the K to 12 Curriculum, secondary school mathematics teachers must be equipped with enhanced skills and proficiency in teaching Mathematics and Statistics subjects in Grades 7 to 12. In this connection, the Mathematics Program of UP Cebu is offering short courses on Analytic Geometry and Calculus, Logic & Linear Programming, Basic Statistics, Probability and Application Software and Software Packages to strengthen and augment the teachers' knowledge on these subjects.

I. Objectives

The offering of the short courses in mathematics and statistics have the following objectives:

1. To upgrade the Grades 7 to 12 teachers the academic competence in mathematics and statistics that they intend to teach;

2. to add to the high school teachers the knowledge-based mathematics and statistics especially on subjects newly added for the K to 12 curriculum; and

3. to provide high school teachers an opportunity to adapt themselves with the academic demands of mathematics and statistics subjects previously taught in tertiary level.

J. Registration Fees:

Course	Registration Fee Per Participant	Total Number of Hours	Min-Max No. of Participants
Logic & Linear Programming	8,500	48	20 - 25
Probability	8,500	48	20 - 25
Application Software and Software Packages	10,500	48	20 - 30
Basic Statistics	10,500	80	20 - 25
Analytic Geometry and Calculus	10,500	80	20 - 25

Registration fee includes learning modules.

Registration starts on March 24, 2014 at the 2nd floor, Math Faculty Office , AS Building, UP Cebu Lahug, Cebu City

K. Schedule:

Basic Statistics	8-12n	Monday – Saturday
Probability	1-5pm	Monday – Saturday
Calculus	8-12n	Monday – Saturday
Logic & Linear Programming	1-5pm	Monday – Saturday
Application Software and Software Packages	1-5pm	Monday – Saturday

COURSE SYLLABUS

Course Title: Analytic Geometry and Calculus
Course Description: Analytic Geometry; Limits; Derivative and Differentiation; Integration;
                     Applications
Number of Hours: 80
Course Objectives:
    At the end of the course, the participants should be able to:
1. find the standard and general equations of a line;
2. sketch graphs of parabola, ellipse and hyperbola;
3. obtain limits of functions;
4. determine if function is continuous or not;
5. find the derivative of functions;
6. solve some applications involving relative and absolute extrema;
7. sketch the curve of a function using derivatives;
8. solve optimization problems using derivatives;
9. get the antiderivative (integration) of some functions;
10. find areas of a plane region;

Course Outline:

Topics	No. of Hours
1 Preliminaries	
1.1 Real Numbers and the Number Plane	2
1.2 Functions and their Graphs	2
2 Analytic Geometry	
2.1 Line	2
2.2 The Parabola	2
2.3 The Ellipse	2
2.4 The Hyperbola	2
2.5 Translation of Axes	2
First Long Examination	2
3. Limits and Continuity	
3.1 Introduction to Limits	6
3.2 One-Sided Limits	2
3.3 Continuity	4
3.4 Limits at Infinity and Horizontal Asymptotes	1
3.5 Infinite Limits and Vertical Asymptotes	1
Second Long Examination	2
4 Differentiation I	
4.1 Derivatives and Tangents	2
4.2 Rules of Differentiation	6
4.3 Derivatives of Polynomial and Trigonometric Functions	2
4.4 Implicit Differentiation and Higher Derivatives	2
4.5 Derivatives of Exponential and Logarithmic Functions	2
Third Long Examination	2
5 Differentiation II	

5.1 First Derivative and Graphs	2
5.2 Second Derivative and Graphs	1
5.3 Graph Sketching	2
5.4 Optimization Problems	3
5.5 Rates of Change and Related Rates	2
5.6 Other Application of Derivatives	2
Fourth Long Examination	2
6 Integration	
6.1 Antiderivatives	4
6.2 Substitution Rule	4
6.3 Area and The Definite Integral	2
6.4 The Fundamental Theorem of Calculus	2
6.5 Area between Curves	4
Fifth Long Examination	2

Course Requirements: Five Long Examinations, Seatworks, Assignments

Learning Material: Modules in Analytic Geometry and Calculus for Grades 7 to 12

References:
Leithold, Louis, and Louis Leithold. *The Calculus 7*. New York: HarperCollins College Pub., 1996.
Lial, Margaret L., Raymond N. Greenwell, and Charles David Miller. *Calculus with Applications*. Reading, MA: Addison-Wesley, 1998.

COURSE SYLLABUS

Course Title:	Basic Statistics
Course Description:	Statistics; statistical measurement; collection, organization and presentation of data; measures of central tendency, location, dispersion, skewness and kurtosis; point and interval estimation; hypothesis testing; ANOVA; chi-square test of independence; simple linear regression and correlation
Number of hours:	80 hours

Objectives:

At the end of the course, the participants should be able to:

1. describe real problems in statistical terms;
2. determine the appropriate descriptive measures needed in answering selected types of research problems;
3. solve the point and interval estimates of a parameter;
4. perform the appropriate statistical hypothesis testing needed for a given problem;
5. interpret statistical outputs; and
6. give the strength of association between variables

Course Outline:

	TOPICS	NO. OF HOURS
1	INTRODUCTION TO STATISTICS	
1.1	Nature of Statistics	0.25
1.2	Major Areas of Statistics: Descriptive and Inferential Statistics	0.50
1.3	Population and Sample	0.25
2	COLLECTION AND PRESENTATION OF DATA	
2.1	Variables and Measurement	1
2,2	Methods of Data Collection	1
2,3	Sampling: Probability and Non-probability	2
2.4	Tabular and Graphical Presentation of Data	4
2.5	The Frequency Distribution	3
2.6	The Stem and Leaf Display	1
	First Long Examination	2.0
3	DESCRIPTIVE STATISTICS	
3.1	Measures of Central Tendency: The Mean, Median and Mode	4
3.2	Measures of Location: Percentile, Quartiles and Deciles	3
3.3	Measures of Dispersion or Variability: The Range, Interquartile Range, Variance, Standard Deviation, Coefficient of Variation	4
3.4	Measures of Shape: Skewness and Kurtosis	3
	Second Long Examination	2.0
4	PRELIMINARIES TO STATISTICAL INFERENCE	
4.1	Random Experiments, Sample Space, Events	1
4.2	Probabilities	1
4.3	Random Variable	1
4.4	The Normal Distribution	1
4.5	Binomial Distribution	1
4.6	Sampling Distributions	1
4.7	Sample Size Determination	1

5	ESTIMATION	
5.1	Preliminary Concepts	0.5
5.2	Point Estimation	1.0
5.3	Interval Estimation	4.0
	Third Long Examination	2.0
6	HYPOTHESIS TESTING	
6.1	Statistical Hypothesis Terms	1.0
6.2	Types of Errors	1.0
6.3	Critical Region	1.0
6.4	Steps in Hypothesis Testing	0.5
6.5	One-Population Tests	
6.5.1	Test of Means	3.0
6.5.2	Test of Proportions	3.0
	Fourth Long Examination	2.0
7.6	Two- Population Tests	
7.6.1	Test of the Difference Between Two Means	3.0
7.6.2	Test of Difference Between Two Proportions	3.0
7.7	More Than Two Population Means (ANOVA)	3.0
7.8	Chi-square Test of Independence	3.0
	Fifth Long Examination	2.0
8	SIMPLE LINEAR REGRESSION AND CORRELATION ANALYSIS	
8.1	The Sample Coefficient of Determination	2.5
8.2	The Standard Error of Estimate	2.0
8.3	Test Concerning the Correlation Coefficient	3.5
8.4	Assumptions on Linear Regression Analysis	1.0
8.5	Estimation of Parameters	1.0
8.6	Test Concerning the Parameters	1.0
	Sixth Long Examination	2.0

Course Requirements: Six Long Examination, Seat works, Assignment

Learning Materials: Modules on Basic Statistics for Grades 7 - 12

References:
Walpole, Ronald E. *Introduction to Statistics*
Bernstein, Stephen and Bernstein, Ruth *Elements of Statistics I: Inferential Statistics*
Bowerman, Bruce L. and . O'Connel , Richard T, *Busines Statistics in Practice*, 3rd edition
Mendehall W., Beaver R., and Beaver B., *Introduction to Probability and Statistics*. Brooks/Cole, Cengage Learning, 2012.

COURSE SYLLABUS

Course Title: Introduction to Probability
Course Descriptions: Fundamental principle of counting, permutation, combination, probability, random variable, probability distributions of discrete and continuous random variables
Number of Hours: 48
Course Objectives:

At the end of the course, the participants should be able to:
1. apply the counting principle to solve real-world problems;
2. define probability and discuss its uses;
3. apply rules/properties of probability to calculate the probability of an event; and
4. solve problems using the concepts of distributions of discrete and continuous random variables.

Course Outline:

TOPICS		NO. OF HOURS
1	COUNTING PRINCIPLE, PERMUTATION AND COMBINATION	
1.1	The Counting Principle	2
1.2	Permutations	2
1.3	Combinations	2
	First Long Examination	2
1	PROBABILITY	
1.1	Introduction: On the Usefulness of Probability	1
1.2	Building Blocks of the Probability Structure	2
1.3	Definitions of Probability	1
1.4	Properties of the Probability Function	3
1.5	Calculating the Probability of an Event	4
1.6	Conditional Probability and Independence of Events	2
	Second Long Examination	2
2	RANDOM VARIABLES	
2.1	Definition of Random Variable	0.25
2.2	Classification of Random Variables	0.5
2.3	Expectations	0.25
3	DISCRETE DISTRIBUTION	
3.1	Bernoulli Distribution	2
3.2	Binomial Distribution	2
3.3	Hypergeometric Distribution	2
	Poisson Distribution	2
	Third Long Examination	2
4	CONTINUOUS DISTRIBUTION	
4.1	Uniform Distribution	2
4.2	Normal Distribution	2
4.3	The standard normal distribution	3
4.4	The Normal approximation to the Binomial	1
4.5	Exponential Distribution	2
4.6	Gamma Distribution	2
	Fourth Long Examination	2

Course Requirements: Four Long Examinations, Seat works, Assignments

Learning Materials: Modules on Probability for Grades 7 - 12

References:

Asimow, L., and Maxwell, M., *Probability and Statistics with Applications: A Problem Solving Text*, ACTEX Publications, Inc., 2010.

Mendehall W., Beaver R., and Beaver B., *Introduction to Probability and Statistics, Fourteen Edition*. Brooks/Cole, Cengage Learning, 2012.

Mendelhall, Wakerly and Scheaffer, Mathematical Statistics with Applications, PWS-Kent Pub. Co. , 1990

Rohatgi, V., and Saleh E., *An Introduction to Probability and Statistics, Second Edition*. Canada: John Wiley & Sons, Inc., 2001.

COURSE SYLLABUS

Course Title: Linear Programming and Logic
Course Description: Equivalent formulations of a linear program; graphical solution of E2; pivoting;
                        the simplex and dual simplex algorithms; post-optimality analysis; algebra of
                        propositions; predicates and quantifiers; rules of Inference
Number of Hours: 48
Course Objectives:

At the end of the course, the participants should be able to:

1. identify linear programming (LP) problems from given application problems
2. formulate an LP model from given maximum/minimum word problems involving (a) 2 variables and (b) n variables
3. determine and interpret the solution of a maximum/minimum LP (a) graphically/algebraically and (b) using a computer
4. conduct a sensitivity analysis on a given optimum LP solution
5. identify statements and its truth value
6. give its truth tables for different types of compound statements
7. identify two logically equivalent statements
8. give the converse, inverse and contrapositive of an implication
9. know when a statement is a tautology, self-contradiction or contingency
10. familiarize logical identities
11. determine what is a predicate and be familiar with the universal, existential and unique existential quantifiers
12. determine rules of Inference to be used to write formal proofs
13. prove basic mathematical statements using different methods

Course Outline:

Topics	No. of Hours
1. Introduction to Linear Programming (LP)	
1.1. Historical Backgroud of LP	1
1.2. Some classic LP problems' formulation	1
1.2.1. Optimal product mix	1
1.2.2. Mineral extraction/diet problems	
1.2.3. Standard transportation problem	
1.3. Basic elements of an LP model; two properties in the linearity assumptions	1
1.4. Formulation of a maximization/minimization LP	3
First Long Examination	2
2. Solution to LP problems	
2.1. Graphical solution of an LP problem in R^2	2
2.1.1. Max LP	
2.1.2. Min LP	
2.2. Algebraic solution of an LP problem in R^2	2
2.2.1. Mathematical preliminaries	
2.2.2. Symmetric form of an LP problem	
2.2.3. Standard form of an LP problem	
2.2.4. Feasible canonical form of an LP problem	
2.2.5. Simplex Algorithm	
2.3. Simplex method	3
2.3.1. Two-phase/phase I - phase II simplex	

2.3.2. Big-M technique	1
2.4. Revised simplex method	1
2.5. Dual simplex method	3
2.6. Computer solution of LP problems	2
Second Long Examination	
3. Propositional Logic	
3.1. Statements	0.5
3.2. Truth Value of a Statement	0.5
3.3. Propositional Variables and Arguments	1
3.4. Compound and Conditional Statements	1
3.5. Truth Tables	1
4. Propositional Equivalence	
4.1. Logically Equivalent Statements	1
4.2. Converse, Inverse and Negation, Contrapositive	2
4.3. Categories of Propositional Forms	1
4.4. Logical Identities	2
Third Long Examination	2
5. Predicates and Quantifiers	
5.1. Predicates and Universe of Discourse	1
5.2. Quantifiers	1
6. Rules of Inference	
6.1. Rules of Inference for Propositional Logic I	1
6.2. Rules of Inference for Propositional Logic II	1
6.3. Formal Proofs	2
6.4. Fallacies	1
6.5. Rules of Inference for Quantified Statements	1
6.6. Methods of Proof	3
Fourth Long Examination	2

Course Requirements: Four Long Examinations, Seatworks, Assignments

Learning Material: Modules in Linear Programming and Logic for Grades 7 to 12

References:
Gass, Saul I. *Linear Programming: Methods and Applications.* 5th ed. New York: Dover Publications, 2003.
Kalish, Donald, Robert J. Fogelin, Gary Mar, and Richard Montague. *Logic: Techniques of Formal Reasoning.* New York, NY: Oxford Univ., 1992.
Pospesel, Howard. Introduction to Logic: Propositional Logic. N.p.: Pearson, 1999.

Winston, Wayne L. *Operations Research: Applications and Algorithms.* 4th ed. N.p.: Cengage Learning, 2003

Course Title: Applications Software and Software Packages

Course Description: Use of database software, spreadsheet and statistical software packages (e.g., SPSS MS Excel) for database management

Course Objectives

At the end of this course, students should be able to:

1. master basic statistical functions of MS Excel and SPSS
2. perform various statistical methods using the software
3. create informative and high-impact materials in data presentation
4. enhance statistical programming skills through Excel Macros, and SPSS

Course Outline

Topics	No. of Hours
1. Introduction	
1.1 Introduction to the Windows Interface	0.5
1.2 Microsoft Office and other Office software packages	0.5
1.3 MS Excel and Statistical Software	0.5
1.4 Some useful keyboard shortcuts	1
2. Microsoft Excel	
2.1 Getting Started with Microsoft Excel	1.5
2.2 Working with Formulas and Functions	2
2.3 Creating Charts and Graphics	2
2.4 Programming Excel in VBA	1
First Practical Test	1
3. SPSS	
3.1 SPSS Overview	0.25
3.2 The Data Editor	0.5
3.3 Data Transformations	0.5
3.4 Working with the Output Viewer	0.25
3.5 SPSS Procedures	0.5
4. Descriptive Statistics in MS Excel and SPSS	
4.1 Measures of Central Tendency	2
4.2 Measures of Location:	1
4.3 Measures of Dispersion or Variability:	2
4.4 Coefficient of Variation	1
4.5 Measures of Shape	1
Second Practical Test	1
5. Presentation of Data in MS Excel and SPSS	
5.1 Tabular Presentation	
5.1.1 Cross Tabulation Table	2
5.1.2 The Percentage or Frequency Tables	1
5.2 Graphical Presentation	
5.2.1 Bar Chart and Histogram	1.5
5.2.2 Line Chart	1.5
5.2.3 Box and Whiskers Plot	1.5

5.2.4 Pie Chart	1.5
Third Practical Test	1
6. Hypothesis Testing on MS Excel and SPSS	1
6.1 One-Population Tests	
6.1.1 Test of Means	2
6.1.2 Test of Proportions	2
6.2 Two- Population Tests	
6.2.1 Test of the Difference Between Two Means	2
6.2.2 Test of Difference Between Two Proportions	2
Fourth Practical Test	1
6.3 More Than Two Population Means (ANOVA)	2
6.4 Chi Square for Independence	2
7. Simple Linear Regression and Correlation Analysis in SPSS	
7.1 The Simple Linear Regression	2
7.2 The Correlation Analysis	2
Fifth Practical Test	1

Course Requirements: Hands-on Exercises, Five Practical Tests

Reference:
   Zagumny, M. (2001). *The SPSS® Book: A Student Guide to the Statistical Package for the Social Sciences®*. ISBN-13: 978-0595189137

Embedded 'Help' and 'Tutorials' in MS Excel and IBM SPSS softwares