Department of Education DepED

Tanggpan ng Kalihim
Office of the Secretary

MAY 17 2010

DepEd Order
No. 55 s, 2010

POLICIES AND GUIDELINES ON STRENGTHENING SCIENCE AND MATHEMATICS EDUCATION AT THE SECONDARY LEVEL

TO : Undersecretaries
Assistant Secretaries
Bureau Directors
Regional Directors
Schools Division/City Superintendents
School Heads of High Schools with Special Science Classes

1. Cognizant of the need to strengthen Science and Mathematics Education in the Philippines and in support of the 2010 Secondary Education Curriculum (SEC), the Department of Education through the Bureau of Secondary Education is providing financial subsidy to the following school types:

Type A are the one hundred ninety-seven (197) schools offering Special Science Classes which were formerly referred to as the Engineering and Science Education Program (ESEP) of the S & T Oriented High Schools, and

Type B are the additional six hundred (600) selected regular secondary schools that will establish one Special Science Class in each curriculum level

2. The policies governing the delivery of Science and Mathematics education in the above- cited schools are stipulated in Enclosure No. 1, which focuses on the following:

A. 2010 SEC and relevant provisions of the DepEd Order 41, s. 2004
B. Organization of Classes
C. Participation to the Program
   C.1 Admission
   C.2 Retention
   C.3 Transfer
   C.4 Grading System
   C.5 Selection of Honor Students

D. Teacher Selection
E. Instructional Materials
F. Financial Assistance
G. Course description of additional subjects

3. Each of the 197 Type A schools shall receive PhP 300,000.00 from the total financial assistance to be appropriated and Type B schools shall receive PhP 83,000.00 also, from the appropriation for the establishment of Special Science Classes, both subject to the release of funds for the said purposes by the Department of Budget and Management (DBM). Enclosure 2 shows the allocation of funds by region.

4. For Type A schools, the amount of subsidy shall be specifically used for the following:

Not to exceed 25 %	Procurement of instructional resources including references for Science, Mathematics and Research .
Not to exceed 15 %	Maintenance and repair of previously owned science & mathematics equipment, computers and printers including Internet subscription and minor repair of laboratory rooms.
Not to exceed 10%	Procurement of consumables for science and mathematics laboratories.
Not to exceed 15 %	Subsidy for student science researches/projects. Expenses for student researches shall be in the form of support to the conduct of science and mathematics investigatory projects such as payment for laboratory analysis. The subsidy should not be used to support student participation in competitions not conducted by DepEd.
Not to exceed 15 %	Professional upgrading of Science and Mathematics teachers handling Special Science Classes, including attendance to seminars that are sponsored by DepEd.
Not to exceed 20%	Participation to DepEd-sponsored Science activities

5. For Type B schools, the appropriation shall be used to augment the Maintenance and Other Operating Expenses (MOOE) of schools which shall be used strictly for the following activities of the Special Science Classes.

Not to exceed 50%	Procurement of instructional resources including references for Science, Mathematics and Research .
Not to exceed 25 %	Maintenance and repair of previously owned science & mathematics equipment, computers and printers including Internet subscription and minor repair of laboratory rooms.
Not to exceed 25%	Procurement of consumables for science and mathematics laboratories.

6. The heads of recipient schools shall submit to the Director, Bureau of Secondary Education, the physical and financial accomplishment reports pertaining to the utilization of the subject subsidy, copy furnished the Division and Regional Offices.

7. Immediate dissemination of and compliance to this Order is directed .

MONA D. VALISNO
Secretary

5/13

Encls.:
As stated

Reference:
DepED Order: (No. 41, s. 2004)

To be indicated in the Perpetual Index
under the following subjects:

CURRICULUM
FUNDS
PROCUREMENT
RULES & REGULATIONS
SCHOOLS
STUDENTS

Enclosure No. 1 to DepEd Order No. 55, s. 2010)

Implementing Policies and Guidelines

A. Curriculum

A.1 The core subjects offered in the 2010 Secondary Education Curriculum shall be enhanced by the additional subjects identified in the Revised Curriculum of the Engineering and Science Education Program (ESEP) of the S & T-Oriented High Schools (DepEd Order No. 41, s. 2004).

A.2 The subject offerings, time allotment and unit credits stipulated in DepEd Order No. 41, s. 2004, (please see Enclosure No. 3) shall be strictly implemented. However, supplementary subjects may be offered as deemed necessary, but the suggested curriculum offerings should not be minimized to be able to offer other courses.

A.3 The curricula of Science, Mathematics, English and Technology & Livelihood Education are enriched. Course descriptions of additional subjects are provided herein.

B. Organization of Classes

B.1 Type A schools

B.1.1 There shall be at least two (2) classes in each of the curriculum year level.

B.1.2 All classes shall have a maximum of forty (40) students per class for better instruction and improved laboratory work. The Bureau of Secondary Education (BSE) DepEd should be furnished with the number of special science classes indicating the number of students enrolled in each class.

B.2 Type B schools

B.2.1 The identified secondary schools shall have one (1) class in each of the curriculum year levels offering SSC.

B.2.2 Classes shall have a maximum of forty (40) students per class for better instruction and improved laboratory work. The Bureau of Secondary Education (BSE) DepEd should be furnished with the number of students enrolled in each Special Science Class.

C. Participation to the Program

C.1. Admission

C.1.1 For Type A Schools

Students shall be admitted to the program based on the following requirements:

C.1.1.1 Elementary pupils who belong to the top ten (10) of the graduating class for schools with one hundred (100) or less pupils and ten percent (10%) of the graduating class for schools with more than one hundred (100) graduating pupils. These pupils should present a certification from the Principal that they belong to this group.

Selection shall be done in two (2) stages to be conducted by the school as follows:

Stage 1 – Preliminary elimination by the school including the interview process

Stage 2 – Written examination prepared by BSE.

C.1.2 For Type B Schools

Students shall be admitted to the program based on the following requirements:

C.1.2.1 All students enrolled in the First Year shall be encouraged to take the BSE-prepared Admission Test.

C.1. 2 .2 The school screening committee (school principal, head teachers/department chairpersons of Science and Mathematics) shall interview the top seventy (70) examinees in the admission Test to determine the students who will attend SSC.

C.2 .1 Retention in the program (for both types of schools)

To remain in the program, the student should obtain a general average of 85% in Science, Mathematics & English and 83% in the rest of the subjects without grade lower than 80% in any grading period. Failure to meet the grade requirements shall be a cause of transfer to the regular class.

C.3.1 Transfer

C.3.1.1 Students enrolled in these schools are allowed to transfer laterally, at any curriculum year level (except in the fourth year) to another S & T Oriented (ESEP) High School, as long as the grade requirement is maintained;

C.3.1.2 Transfer from a regular high school to SSC Classes shall not be allowed in any curriculum year.

C.3.3 Transfer from any science high school to these classes shall be allowed, provided the student has no grade below 80 % in any of the subjects.

C.4 Grading System

C.4.1 The system of grading shall be based on the criteria as stipulated in DepEd Order No. 33 s. 2004.

C.4.2 There shall be four (4) quarters in one (1) school year.

C.4.3 Method of grading shall be averaging.

C.4.4 The numeral system of grading shall be in multiples of one.

C.5 Selection of Honor Students (for Type A schools only)

C.5.1 Schools implementing the program shall have a separate set of honor students for the graduating class provided the graduating class is not less than sixty (60) students.

C.5.2 Candidates for honors at any year level must have a general average not lower than 85% in, Science, Mathematics and English and without any grade lower than 83% in the rest of the subjects.

C.5.3 Top fifteen (15) students shall be ranked using 7-3 point scheme (7 points for academic performance and 3 points for leadership in co-curricular activities) as explained to DepEd Order No. 33, s. 2004.

C.5.6 In case of a tie, candidates may both be declared for the honor ranking for example both as valedictorians, salutatorians, first honorable mention, etc.

C.5.7 Any teacher who is related within the second degree of affinity or consanguinity to any candidate for honors shall not be allowed to sit as member of the Selection Committee.

C.5.8 The Head of the school as chair of the committee shall make the final announcement of honor students.

C.5.9 Protest, if any shall be filed with the Office of the Principal by candidates and their parents/guardians within five (5) working days before the graduation rites.

D. Teacher Selection (for both types of schools)

D.1 Teachers to be assigned to ESEP classes of S & T Oriented High Schools should preferably have the following qualifications:

D.1.1. Honor graduates of CHED-recognized teacher education institutions, preferably DOST scholars;

D.1.2 Passed the Professional Board of Examination for Teaching (PBET) or Licensure Examination for Teachers (LET); and

D.1.3. Have undergone BSE-managed training to be able to teach the revised curriculum offerings.

E. Instructional Materials (for both types of schools)

E.1 The school shall have provided the Special Science classes with the following:

E. 1.1 Books/references and magazines

* textbooks and references;
* periodicals of national circulation; and
* professional magazines, national and international circulations.

E.1.2 Supplementary materials:

* Encyclopedia
* Dictionary
* Atlas/Almanacs
* Maps/charts
* Educational CDs in Science, Mathematics and English/Research

E.1.3. Laboratory rooms

* availability of a laboratory room for Science, Mathematics and

Computer education

- availability of the minimum required Science, Mathematics and Computer equipment

F. Financial Assistance

F.1 The SSC of the formerly referred ESEP classes of the S & T Oriented High Schools shall be granted an annual financial assistance in the amount of P250,000.00 to augment their regular allocation for Maintenance and other Operating Expenses (MOOE) ; whereas,

F.2 Special Science Class of selected regular secondary schools shall be granted financial assistance in the amount of P75,000.00 to augment their regular allocation for Maintenance and other Operating Expenses (MOOE)

G. Description of Additional Subjects

First Year

G.1. Developmental Reading

Developmental Reading for science-oriented high schools serves as a reading laboratory focusing on science texts. It is intended to equip first year students with reading comprehension skills and develop the ability to determine the text structure of scientific and technical discourse. This serves as a preparatory course to Research Writing I or Technical Writing which will be taken up in the second year. It provides students with further exposure to and practice in decoding texts that serve as models in the forthcoming writing course.

The reading laboratory consists of two sets of materials: (a) the basic texts made up of multi-level graded work-type reading selection targeting vocabulary and reading comprehension skills, and (b) intensive exercises for remediation focusing on skills least mastered by the learner.

A yearly offering for the curriculum year, it is allotted 60 minutes only once a week with only 0.3 units credit.

G.2 Earth and Environmental Science

Earth Science deals with the study of the Earth, its history, changes and place in the universe. It has several interweaving and most often overlapping branches like geology, (the study of the earth's origin, history and structure); meteorology (study of the earth's atmosphere, weather and climate): and oceanography (study of the earth's oceans, including their physical features, life forms and natural resources and many more).

Environmental Science is an introduction to the entire spectrum of relationship between people and the environment. It integrates biological and physical science as well as the cultural, historical, ethical, economic, social and philosophical aspects of the environment.

Earth Science is offered in the first two grading periods with Environmental Science in the last two grading periods and allotted 240 minutes per week with 1.2 unit credit.

G.3 Mathematics I (Elementary Algebra).

Mathematics I is Elementary Algebra. It introduces the real number system with its properties, and proceeds to simple manipulation of algebraic expression, after which solutions and graphs of linear equations are discussed, together with its applications to word problems. The subject ends with a discussion of both algebraic and graphical solutions to systems of linear equations and inequalities.

A yearly offering for the curriculum year, it is allotted 300 minutes per week with 1.5 unit credits.

G.4 Technology and Livelihood Education (TLE) (Computer Education).

In the first year, all students of the special science classes shall take up Computer Education.

The prepared course of study is primarily designed to equip the students with an adequate knowledge necessary to the understanding and appreciation of computers as data processing tools and of the fundamental concepts of electronic data processing. It covers introduction to computer concepts, operating systems, file storage and management, viruses and anti-virus measures, word processing, spreadsheets, desktop publishing and presentation software, networking and the internet and webpage design.

These topics enable students to identify the essential features of data processing, understand the concept of computer-based information processing system and identify and describe the basic functions performed by hardware devices or components normally associated with a computer system.

A yearly offering for the curriculum year, it is allotted 300 minutes per week with 1.5 unit credits.

Second Year

G.5 Research I (English for Science and Technology) and Basic Statistics

G.5.1 English for Science and Technology

Research I equips Second Year students of S & T Oriented (ESEP) High Schools with research skills that will enable them to prepare research reports, investigatory projects, and a research proposal utilizing information obtained from library and on-line resources.

It develops scientific and technical writing skills required in writing and documenting research proposals and investigatory projects, among others.

G.5.2 Basic Statistics in Research

This course aims to develop basic statistic skills needed in research, e.g. problem identification, knowledge of the types and uses of data, data collection and analysis. Basic Statistics is taken together with scientific technical writing. Basic Statistics enables the students to gather, analyze, and organize data. Technical Writing provides the basic concepts and skills in presenting information in descriptive and textual form.

English for Science and Technology shall be offered during the first two grading periods while Basic Statistics in Research shall be covered during the last two (2) grading periods in the curriculum year.

This subject is allotted 300 minutes per week with 1.5 unit credit.

G.6 Mathematics II a (Geometry)

This subject covers topics in plane geometry. It begins with a discussion of the basic terms and concepts in geometry and proceeds to properties of the triangle, quadrilaterals, polygons and circles. It emphasizes the development of the ability of students to analyze deductively and prove the different theorems on the topic.

A yearly offering for the curriculum year, it is allotted 300 minutes per week with 1.5 unit credits.

G.7 Mathematics IIb (Intermediate Algebra)

It is a continuation of algebra I and is taken as an additional subject in second year. The subject begins with a more advanced manipulation of algebraic expression such as factoring and special products, simplification of rational and

radical expressions, and proceeds to the solution of quadratic, rational, and radical equations. The topic of variations is likewise included in the subject.

A yearly offering for the curriculum year, it is allotted 300 minutes per week with 1.5 unit credits.

G.8 Technology and Livelihood Education

Technology and Livelihood Education (TLE) is a specialization offered by the school that should depend on the availability of teachers and the materials/equipment in the school. There are four (4) choices namely. 1) Agri/Fisheries, 2) Civil Technology, 3) Electrical Electronics, and 4) Information and Communication Technology. The specializations should be taken up by the students from Second Year to Fourth Year. The offering of a specialization shall be not more than two (2) of the specified four subjects

G.8.1 Civil Technology (CT)

This program shall enable Second Year High School learners to perform tasks on the fundamentals of Civil Technology. This includes analytical and technical science; dimensioning and measurement techniques; sawing operations; planing techniques and operations; chiseling and boring operations; wood joint preparation and operations; application of gluing and metal fastening; job sheet preparation and designing.

A yearly offering for the curriculum year it is allotted 240 minutes every week with 1.2 unit credits.

G.8.2 Electrical Electronics (EE)

The course prepares Second Year high school students to a wide range of fundamental competencies in electricity and electronics. It covers the basic concepts of electricity like the characteristics of insulators and conductors, wire splices and joints; soldering techniques; electricity and electronic circuits. Also included in the study are the electrical and electronic instruments, circuit analysis/printed circuit boards (PCB), understanding of power supply assembly, and entrepreneurship in electricity and electronics.

A yearly offering for the curriculum year, it is allotted 240 minutes every week with 1.2 unit credits.

G.8.3 Information and Communication Technology (ICT)

ICT education for the Second Year students of the S & T Oriental High School is computer hardware and software management. The course shall cover installation and operations of computer peripherals and basic troubleshooting, desktop publishing using Page Maker, basic photo and video editing and advance web-page design using Frontpage. It shall also develop the students' artistic skills in graphics editing, comprehensive desktop publishing and web-page design.

These topics shall serve as a tool for students to identify and implement hardware and software solutions for a variety of learning environments.

A yearly offering for the curriculum year, it is allotted 240 minutes every week with 1.2 unit credits.

Third Year

G.9.1 Biotechnology

The course aims to make the students aware of the goals and processes of biotechnology (defined as using organisms for practical purposes) as well as the ethical/moral issues attendant to it.

The course consists of two main parts: (1) the first discusses the biological and chemical basis of biotechnology, and (2) the second part presents the applications of biotechnology in medicine, agriculture, environment and research.

Biotechnology is a semestral course. This subject together with Advanced Statistics are allotted 300 minutes per week with 1.5 unit credit.

G.10.1 Advanced Statistics

Advanced Statistics for Third Year students is a continuation of Basic Statistics taken during the Second Year. This course will provide deeper understanding on how statistics is used in scientific research. Statistical reasoning and application of common statistical methods will be the focus of the course, giving the students the necessary tools to analyze complex problems in the physical and biological sciences.

The course is elementary in mathematical level, but designed to be conceptually rich in statistical ideas so that students can use statistical methods with understanding. This course shall be offered together with **biotechnology.** While Advanced Statistics equips students with necessary statistical tools. Biotechnology provides opportunities for possible research work. At the end the course, students are expected to work

on at least one research problem and must present their results in public oral presentation.

This subject together with Biotechnology is allotted 300 minutes per week with 1.5 unit credit.

G.11 Technology and Livelihood Education

GI.11. Civil Technology (CT)

The course deals with the specialized processes and operations in civil technology specifically in the operation, use and maintenance of woodworking machine, design and construction of furniture, application of wood finishing materials, upholstery work, and wood carving operations and techniques. The course also includes training in livelihood and entrepreneurial development, focused on the set-up of a small business utilizing the processes, operations and techniques acquired from the course.

A yearly offering for the curriculum year, is allotted 240 minutes every week with 1.2 unit credits.

G.11.2 Information and Communication Technology (ICT)

Information and Communication Technology for the third year students the S & T Oriented (ESEP) High School focuses on Basic Computer Programming. This course is designed to expose student to structured programming concepts, principles and paradigms for future programmers. It covers a set of rules regarding the declaration of variables, the use of flowcharts, program structure and flow of control.

These topics should serve as a tool for students to develop and practice good programming habits essential to learn other programming languages and database software.

A yearly offering for the curriculum year, it is allotted 240 minutes every week with 1.2 unit credits.

G.11.3 Electrical Electronics (EE)

This course deals with the basic knowledge of residential and commercial wiring procedures and practices. Students are expected to perform the standard basic wiring installations for them to experience different electrical connections in preparation for the wiring activities. It also covers troubleshooting of lighting fixtures as well as performance of alarm wiring installation. The course includes the study of the manual and

automatic operated motor control and digital electronics, and the operation of the different types of sensors.

A yearly offering for the curriculum year, it is allotted 240 minutes every week with 1.2 unit credits.

Fourth Year

G.12 Mathematics IV- Pre-Calculus and Calculus

The subject covers topics in pre-calculus and an introduction to differential calculus. The subject begins with a comprehensive discussion on inequalities (polynomial, rational and absolute value) and proceeds to the properties and graphs of the algebraic and transcendental functions such as the polynomial, rational, exponential and logarithmic functions. An intuitive discussion of limits is then covered and followed by derivatives and its properties. The subject ends with the application of derivatives to optimization problems.

A yearly offering for the curriculum year, it is allotted 300 minutes per week with 1.5 unit credit.

G.13 Research II

Research II for the Fourth Year deals with researches in Science. A study of the course equips the students with the knowledge and skills of conducting researches in science and in preparing for scientific communication which may serve as an avenue for higher level of competence in Research.

In order to acquire in scientific writing skills, students are exposed to the rudiments of conducting researches, writing research reports, and preparing for the science congress.

A yearly offering for the curriculum year, it is allotted 300 minutes per week with 1.5 unit credit.

G.14 Advanced Chemistry

Advanced Chemistry includes the basic ideas in chemistry with emphasis on reaction chemistry including topics that may be considered extensions of basic chemistry as well as their application. The extension topics are included so as to prepare high school students in their higher course.

A yearly offering for the curriculum year, it is allotted 240 minutes every week with 1.2 unit credits.

.G15 Advanced Physics

Advanced Physics deals with the basic concepts in mechanics, fluids, modern physics and nuclear physics. The course seeks to build the conceptual base started in the lower years and then use this as a step further into a greater involvement in physics via the numerous calculations made in its applications and formula derivations.

G.16 Technology and Livelihood Education (TLE)

G.16.1 Information and Communications Technology (ICT)

This course for Fourth Year S & T Oriented High School students is Advanced Computer Programming. The course includes a thorough introduction to computer and software engineering concepts.

These topics should serve as bases for students to design, code and test their own programs.

A yearly offering for the curriculum year, it is allotted 240 minutes every week with 1.2 units credit.

G.16.2 Civil Technology (CT)

The course deals with the specialized processes and operations in civil technology specifically in skeletal frameworks, building plan interpretation, rough and finish carpentry work and finish masonry. The course also includes training in livelihood and entrepreneurial development, focused on the set-up of a small business utilizing the processes, operations and techniques acquired from the course.

A yearly offering for the curriculum year, it is allotted 240 minutes every week with 1.2 units credit.

G.16.3 Electrical Electronics (EE)

Electrical and Electronics for fourth year cover the principles and operations of single phase motor with the end goal of preparing a plan to fix electrical facilities. The operating principles of three-phase motor is also included in this course. It provides opportunity for the students to identify repair work of appliances with heating elements. In electronics,

component, student will learn the operations of different amplifiers and the construction of the amplifier as a two-way intercom system.

A yearly offering for the curriculum year, it is allotted 240 minutes every week with 1.2 units credit.

Subject offerings other than those mentioned, shall follow the Learning Competencies required of the regular classes.

(Enclosure No. 2 to DepEd Order No. 55, s. 2010)

Regional Allocation for The Establishment of Special Science Class in Selected Secondary Schools

Region	No. of schools	Amount
I	40	3,320,000.00
II	25	2,075,000.00
III	40	3,320,000.00
IV A	40	3,320,000.00
IV B	25	2,075,000.00
V	40	3,320,000.00
VI	40	3,320,000.00
VII	40	3,320,000.00
VIII	40	3,320,000.00
IX	25	2,075,000.00
X	40	3,320,000.00
XI	40	3,320,000.00
XII	25	2,075,000.00
XIII	40	3,320,000.00
CAR	25	2,075,000.00
NCR	40	3,320,000.00
ARMM	35	2,905,000.00
Total	say,	49,800,000.00 say, 50,000,000.00