POSTGRADUATE INSTITUTE OF SCIENCE (PGIS)

UNIVERSITY OF PERADENIYA

Postgraduate Diploma in Science Education

1. INTRODUCTION

Postgraduate Diploma in Science Education is designed for science graduates who are seeking credentials to become teachers. Science helps children to see the future with an open mind. Children are the treasures of future and, it is the responsibility of the teachers to make young lives prepared to meet the challenges in future. Science teachers have a bigger responsibility than the other teachers in shaping the lives of future generation because of the advances in science and technology. This programme is designed to have significant impact on science/mathematics teaching and learning in classrooms and raising science/mathematics standards in schools. It helps teachers and prospective teachers in developing themselves to become effective science/mathematics teachers. By obtaining the Postgraduate Diploma in Science Education they will be eligible to apply for the M.Sc. in Science Education programme offered by the Postgraduate Institute of Science (PGIS.) The programme is offered only in English medium.

2. OBJECTIVES OF THE PROGRAMME

The programme will help the learners (science teachers & prospective teachers) to be able to:

- maximize their potential as teachers and learners in their classrooms
- develop skills in curriculum design in science and mathematics
- understand students and help them in learning science and mathematics
- assess students and provide them with constructive feedback
- undertake classroom-based action research
- work closely with other teachers
- build up a network with teachers and education officers
- accountable for what they do
- satisfy themselves in becoming science/mathematics teachers

3. PROGRAMME ELIGIBILITY

The candidates possessing a Bachelor's Degree (B.Sc.) from a recognized university are eligible to apply for the programme--Postgraduate Diploma in Science Education. Candidates who meet eligibility requirements and successful at the aptitude test and interview will be admitted to the programme.

4. PROGRAMME FEE

(*N.B. The programme fees given below may be revised.*)

	M.Sc. programme fee
local candidates	Rs. 70,000/-
foreign candidates	Rs. 140,000/-

Students registered for the M.Sc. degree shall pay the Programme fee in full or in two *(1/2 at the registration and the balance at the end of the first semester)* or three *(1/3rd at the registration, another 1/3rd after 4 months from the date of registration and the balance after 8 months from the date of registration)* installments. Other payments including registration fee, medical fee, library subscription, examination fee and deposits (science and library) should be paid according to the procedure stipulated by the PGIS. (N.B. The Programme fees given above may be revised as per recommendation of the Board of Management of the PGIS.

5. PROGRAMME STRUCTURE AND DURATION

The programme will be of twelve month duration and, consists of coursework and an independent study on an area of student's interest in science education. Coursework will be conducted over a period of two semesters of 15 weeks (during weekends.) **Continuous attendance is compulsory throughout the programme of study**. The programme of study consists of six compulsory courses including teaching practice and an independent study and four optional courses. Satisfactory completion of a minimum of 24 credits including coursework, teaching practice, independent study with a GPA of not less than 2.75 is required to obtain the Postgraduate Diploma in Science Education.

6. PROGRAMME SUMMARY

The programme of study consists of 450 hours; 270 hours of coursework (18 credits), 90 hours of teaching practice component in schools (3 credits) and 90 hours of an independent study (3 credits.) To earn the required number of credits, students should take the six compulsory courses including independent study and the teaching practice component to develop capability of teaching. Four optional courses could be selected from the courses offered. (In a given academic year all the courses listed may not be offered.)

Course code	Course Title	No. of Hours	No. of Credits
SED 501	World View of Science	30	2
SED 502	Science Education: A Comparative Perspective	30	2
SED 503	Teaching Science & Mathematics for Understanding	45	3
SED 504	Teachers as Researchers	45	3
SED 505	Philosophical Inquiry and Contemporary Issues in Science Education	30	2
SED 506	Learners and Learning in Context*	30	2
SED 507	Child Development and Psychobiology	30	2
SED 508	Use of Computers in Teaching Science/Mathematics*	30	2
SED 509	Classroom Management for Science/Mathematics Teaching*	30	2
SED 510	Inclusive Education for Children with Special Needs to Learn Science/Mathematics*	30	2
SED 511	Curriculum Design for Science/Mathematics Teaching*	30	2
SED 512	Assessment Practices in Science/Mathematics Classrooms	30	2
SED 513	Teaching Practice	90	3
SED 514	Independent Study	90	3
SED 515	Guidance and Counselling in Science/Mathematics Education*	30	2

* *Optional courses*

7. CONTENTS OF THE PROGRAMME

SED 501: World View of Science (2 credits)

Nature of science, scientific inquiry, images of science, scientists and contributions. Familiarize students with important episodes and individuals from the history of science including the salient facts about the lives of great scientists. Foundations of science and its relation to other disciplines. Issues of language in science education and nature of science to the learning of science.

SED 502: Science Education: A Comparative Perspective (2 credits)

Trends in science education in the SAARC countries and the world in developing man power. Historical perspectives and contemporary debates; current developments in science education and significance for the skills and knowledge; public understanding of science.

SED 503: Teaching Science and Mathematics for Understanding (3 credits)

Paradigm shift from traditional teacher-centred teaching to student-centred teaching with emphasis on teaching for conceptual change, problem-based learning, problem solving with collaborative learning and, social constructivism in learning and teaching. Use of audio visual aids in teaching.

SED 504: Teachers as Researchers (Action Research) (3 credits)

Students will explore how action research could be used to gain a fuller understanding of individual and group managerial behaviours and problems in their classrooms. Each student has to undertake a study during the teaching practice period and make an oral presentation and submit the report.

SED 505: Philosophical Inquiry and Contemporary Issues in Science Education (2 credits)*

An overview of ideas of Popper, Kuhn and Lakatos with emphasis on falsification, paradigm shifts and tacit knowledge. Distinctive modes of reasoning used in philosophical, ethical and, historical discussions and encourage the development of a philosophical and historical perspective on scientific and ethical questions. Analytical tools used for evaluating current educational goals, practices, issues and reforms.

SED 506: Learners and Learning in Context (2 credits)*

Natural and socially constructed differences among learners. Multiple literacies/intelligences. Role of social context and socio-cultural background in learning. Encourage students to explore the social nature of science/mathematics and to appreciate the fact that scientists/mathematicians work in a context, which is influenced by a wide range of social factors. Social identities and role relationships in the classroom. Natural and socially constructed differences among learners. Role of education in social mobility.

SED 507: Child Development and Psychobiology (2 credits)*

Child development in relation to psychological theories. Individual differences in development. Biological contributions to development. Children's perceptual,

emotional, cognitive, linguistic and behavioural development throughout the period from conception to late adolescence.

SED 508: Use of computers in Teaching Science/Mathematics (Interactive Teaching) (2 credits)*

Computer Assisted Learning (CAL) Possibilities, ideas, and issues associated with teaching science/mathematics with technology for multiple representations of scientific/mathematical ideas and to create authentic learning environments. Contemporary conceptual perspectives from educational psychology on important issues of learning. Use of internet to facilitate science/mathematics learning.

SED 509: Classroom Management for Science/Mathematics Teaching (2 credits)*

Methods and strategies used in science/mathematics teaching and styles of classroom management. Classroom as an organization, classroom culture, decision making, leadership and management roles. The role of staff development in the management of change.

SED 510: Inclusive Education for Children with Special Needs to learn Science/Mathematics (2 credits)*

Introduction to special needs education (SNE). Phases of development: denial, segregation, integration and inclusion. Historical development of SNE in the country: 1912, integration (1970), adaptation of Salamanca Statement (1977), special education unit (2000), National Policy on disability for schools (2003). Organization of special needs: school, classroom, SENCO (Special Education Needs Coordinator), teacher. Classification, diagnosis and skills for general education teacher: sensory impairment, intellectual disability, autism, speech-language difficulties, behaviour disorders, health impairment, gifted & talented, physical impairment.

SED 511: Curriculum Design for Science/Mathematics Teaching (2 credits)*

Designing curricular materials in science/mathematics in the light of theoretical principles and ideological perspectives that inform the cultural and philosophical roots of issues of curriculum. Different conceptions of culture and ways estimating the adequacy of curricula to contemporary cultures.

SED 512: Assessment Practices in Science and Mathematics Classrooms (2 credits)*

Functions of assessment, issues and types of assessment. School-based assessment, continuous assessment; Norm-referenced and criterion–referenced assessment; Measures of central tendency, normal and skewed distributions; Taxonomy of educational objectives.

SED 513: Teaching Practice (3 credits)

Students will be placed in two schools (Girls/boys and Mixed) to experience diversity in classrooms. They will work with an experienced teacher at the beginning and then gradually be responsible to undertake teaching all science/mathematics periods for one month. Then they will be placed in the other school. Students will be planning lessons and implement them in the classroom. They will be assessed continually based on their strengths and weaknesses in planning, teaching, assessing and managing the classroom.

SED 514: Independent Study (3 credits)

Students will be doing an independent study based on their teaching practice and submit a written report (about 20 pages, 1.5 spaced, Times New Roman, 12 pts) and do an oral presentation of the same.

SED 515: Guidance and Counselling in Science Education (2 credits)*

The concepts of counselling and guidance in relation to science/mathematics teaching learning situations. History and present status of counselling and guidance in the country. Ethical and professional aspects. Educational counseling and guidance. Counselling approaches: psychoanalytic, behavioural, cognitive-behavioural, person centered, existential, gestalt, reality and rational emotional therapy. Counselling skills for teachers: building relationship, working & termination of counselling relationship, observing, listening, responding and record keeping. Group counselling and guidance. School counselling and guidance: student services including life skills training.

TEACHING PANEL

Dr. Ashoka Abeykoon Menike, Science sectional Head, St. Joseph Balika M.V. Kegalle
B.Sc. (Perad.) Dip. in Ed, M.Sc.& Ph.D. in Science Education. (Perad.)

Mrs. N. Abeyratne, Centre Manager, Teacher Centre, Peradeniya
B.Sc. (Perad.) Dip. in Ed, M.Sc. in Science Education. (Perad.)

Mrs. Udeni P. Ratnayake, Teacher, Vidyartha College, Kandy
B.Sc. (Perad.) Dip. in Ed, M.Sc. in Science Education. (Perad.

Dr. R. D. Gunaratne, Retired Professor & Former Head, Dept. of Philosophy & Psychology, University of Peradeniya *B.A. (Cey.), M.A. (Calif.), Ph.D. (Camb.)*

Mr. Nihal Herath, Former Chief Commissioner, Teacher Education, Ministry of Education *B.Sc. (Cey.), Dip in Ed (Bristol), M.Sc. in Chemical Education (East Anglia)*

Dr. A Jayasena, Retired Professor & Former Head, Dept. of Education, UP
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Dr. S. Karunaratne, Senior Lecturer, Science Education Unit, University of Peradeniya
B.Sc. (Cey.), Dip. in Ed., M.Sc. Agric.(Perad.), M.Ed. in Sc.Ed. (Bristol), Ph.D. in Sc.Ed. (Michigan State)

Dr. G. Kodituwakku, Director/Research, NIE, Maharagama
B.Ed. (Colombo), M.Phil (Perad.),Ph.D. (Colombo)

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Mrs. S.A. Leelaratne Former Director, Dept. of Science, NIE
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Dr. K.M. Liyanage, Director, IT Centre, University of Peradeniya
B. Sc.Eng. (Perad.), M.Eng., Ph.D. (Tokyo)
Mr. R.P. Liyanage, Retired Professor and Head, Dept. of Education, University of Peradeniya
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Mrs. Pramitha Kumari Mahagamage, Teacher, Kirillawela M.V., Kadawatha
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Prof. D. D. Mallikarachchi, , Dept. of Philosophy & Psychology Faculty of Arts, University of Peradeniya *B.A., M.A. (Cey.), Ph.D. (Moscow)*
Dr. G.L.S. Nanayakkara, Formerly Additional Secretary, Ministry of Education
B.Sc. (Cey.), M.Ed. (Sussex) Ph.D. (Reading)
Mr. K. S. K. Peiris Lecturer, Ruwanpura College of Education
B.Sc (Perad.), M.Phil. (Colombo), M.Sc. in Science Education (Perad.)
Dr. P.R.K.A. Vitharana, Senior Lecturer, Dept. of Education, University of Peradeniya
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PROGRAMME COORDINATOR

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