1. Course Number and Title: ED-502: Policy, Strategy and Leadership in Education

2. Credit Hours: 4

3. Course description

The course is designed to provide students comprehensive knowledge about policies, strategies and leadership in education. This course deals with the development of education policies, and practices of strategies required for quality education. Therefore, theories concepts, styles, values of leadership, leadership and teambuilding have been highlighted in the course. Emphasis has been given on the making of leaders for effectively managing education sector.

4. Course Objectives

The objectives are to help learners to:

a) obtain critical understanding of key concepts of policy, strategy and leadership.
b) gain deeper knowledge about challenges and issues influencing policies and strategies.
c) identify the role of stake-holders and their influence in shaping the educational policies and strategies.
d) gain thorough understanding about leadership, styles, competencies.
e) develop skills for leadership for effective management of different fields in the sector of education.
f) gain the ability to apply leadership skills in implementing educational policies, programs at institutional and national level.

5. Course Content **Contact Hours**

Unit-1: Introduction to Policies in Education **10**

Learning Outcomes

At the end of this unit learners will be able to-

a. explain basic concepts of policy and their relation to decision making in education
b. describe ecology and jurisdiction of education policy
c. identify and assess the impact of various factors and role of actors in policy making
d. describe the policy making and implementing process in education in Bangladesh
e. relate education policy, context and globalisation

Content:

- Meaning, definition and concept, relation between policy & decisions
- Ecology of educational policy
- Jurisdiction of policy making in education
- Factors and actors in policy and policy making process in education
- Agencies and institutions responsible for policy formulation (Govt. agencies, Parliament, Assigned agency/ Body)
- Development of educational policy making process and implementation in Bangladesh
- Globalisation and the educational policy context

Unit-2: Strategies in Education **8**

Learning Outcomes
At the end of this unit learners will be able to-

a. define organization, policy, strategy, tactics and interrelationships
b. apply strategic planning and management in education
c. develop a strategic plan and action plan for an educational institution

Content:

- Meaning, concept and definition; relation among strategy, tactics and policy
- Organization, policy and strategy, strategic planning & strategic management
- Strategic planning in education & the school Improvement Program
- Different strategies to expand and improve the education system: Access, participation, completion (year and cycle), promotion, transition, inclusion and quality in education
- Strengths and weaknesses of different strategies

Unit-3: Key Aspects of Leadership 8
Learning Outcomes
At the end of this unit learners will be able to-

a. describe key aspects of leadership
b. explain leadership theories
c. identify leadership styles in education
d. demonstrate leadership skills and qualities
e. compare gender differences in leadership styles

Content:

- Meaning, definition and different ideas about leadership
- Nature and importance of leadership
- Theories and Styles of leadership
- Skills of leadership & qualities of leaders
- Gender differences in leadership styles

Unit-4: Making of Educational Leaders 6
Learning Outcomes
At the end of this unit learners will be able to-

a. identify the personality traits of an effective leader
b. evaluate the importance of skill development in leadership
c. play role as a leader

Content:

- Personality traits of an effective leader
- Skill development in leadership
- Leadership development through motives, self-awareness, self-discipline, education & training, experience & mentoring
- Leadership skill building exercises

Unit-5: Policy, Strategy & the Roles of Leaders in Education in Bangladesh 08
Learning Outcomes

At the end of this unit learners will be able to-

a. analyse the role of leaders in implementing policies, strategies at the organisational/ institutional and national levels
b. formulate plans and strategies to manage oneself as leader in organizations
c. build teams and execute team building purposes
d. motivate teams, manage and coordinate team's efforts in achieving organisational/ institutional goals
e. develop and apply communication skills
f. apply leadership skills for conflict management

Content:

- Role of leaders in implementing education policies: organizational/ institutional & national level
- Leadership and managing self in organizations
- Leadership and teambuilding
- Motivation and people management
- Communication and conflict management

6. Instructional Strategies

a. Lecture/ Discussion
b. Panel/ Forum Discussion
c. Case study and Role play
d. Reading, Assignment & Report/ppt Presentation
e. Library work and students participation in the class
f. Seminar/ Debates/ Group presentation

7. Assessment

	Marks (%)
a. One In-course examination	10
b. Students' analytical and reflective work (combination of at least two of tasks (i) assignment, (ii) project, (iii) term paper, (iv) presentation, (v) review paper, (vi) field work)	40
c. Course final Examination (MCQ+Essay Type) 10+40= 50	

8. Recommended Books, Journals and Reports

1. Ärlestig, H., Day, C., & Johansson, O. (2016). *A decade of research on school principals*: *Cases from 24 countries*. Heidelberg: Springer
2. Ball, S. J. (1995). *Politics and policy-making in Education: Explorations in sociology*. London: Routledge
3. Bell, L. & Stevenson, H. (2006). *Education policy: Process, themes and impact*. London: Routledge
4. Bennett, N., Crawford, M., & Cartwright, M. (Eds.). (2002). *Effective educational leadership*. London: Sage
5. Ben-Peretz, M. (2009). *Policy-making in education: A holistic approach in response to global changes*. New York: Rowman & Littlefield Education
6. Bush, T. & Burnham, J.W. (1994).*The Principles of Educational Management*. London: Longrman.
7. Bush, T., Bell, L., &Middlewood, D. (2010). *The principles of educational leadership & management*. London: Sage
8. Everard, K. B., Morris, G., & Wilson, I. (2004). *Effective school management*. London: Sage

9. Goel, S. L. &ArunaGoel (1994).*Educational policy & administration*.New Delhi: Deep Publishers
10. Gronn, P. (1999).*The making of educational leaders*. London: Cassel
11. Hargreaves, A., Lieberman, A., Fullan, M., & Hopkins, D. (Eds.). (2010). *Second international handbook of educational change*. New York: Springer.
12. Harris, A., & Lambert, L. (2003). *Building leadership capacity for school improvement*. Berkshire: McGraw-Hill Education.
13. Harris, A., Day, C., Hopkins, D., Hadfield, M., Hargreaves, A., & Chapman, C. (2013). *Effective leadership for school improvement*. New York: Routledge.
14. Jones, B. A. (2000). *Educational leadership: Policy dimensions in the 21st century*. Stamford, Conn: Ablex Pub
15. Northouse, P. G. (2018). *Leadership: Theory and practice*. Singapore: Sage publications.
16. Northouse, P. G. (2017). *Introduction to leadership: Concepts and practice*. Singapore: Sage Publications.
17. Salahuddin, A. (2016). *Making a Door: A Case Study of the Leadership and Change Practices of a Principal in Bangladesh* (Doctoral dissertation, The University of Canterbury, New Zealand).
18. Salahuddin, A. (2011). *Perceptions of Effective Leadership in Bangladesh Secondary Schools: Moving towards Distributed Leadership?*(Masters thesis, The University of Canterbury, New Zealand)
19. Thomas, N. (2004). *The John Adair handbook of management and leadership*. London: Thorogood.
20. Townsend, T., &MacBeath, J. (Eds.). (2011). *International handbook of leadership for learning* (Vol. 25). Springer Science & Business Media.
21. Trowler, P., (2003).*Education Policy.* London: Routledge
22. Whitty, G. (2002). *Making sense of education policy: Studies in the sociology and politics of education*. London: Sage
23. UNESCO, (1995). Learning the Treasure Within, Paris.
24. UNESCO, World Declaration on Education: Education For All and Frame work for Action to Meet Basic Learning Needs, EFA Forum Sectt, Paris.
২৫. শিক্ষা মন্ত্রণালয় (২০১০) জাতীয় শিক্ষানীতি, ঢাকা-২০১০।
26. Relevant Govt. Documents & Reports, Acts, Regulations.
27. Related Journal articles &Websites.

1. Course No & Title: ED-503: Information and Communication Technology in Education

2. Credit Hour: 4

3. Course Description

This is a basic course on use of ICT (Information and Communication Technology) in educational purposes. The course contains introductory knowledge on ICT in education, technology in education, educational provisions through internet, ethics and laws of ICTE and related understandings for educational purposes. During the course students will be encouraged to develop knowledge on global and local perspective of ICT in education and its applications in Education. Instructional strategies of the course are lectures, demonstrations, discussions and hands-on practices.

In the lab classes teacher will demonstrate the work and then students will explore and practice themselves, teacher will help them as a facilitator or guide.

4. Course objectives

The objectives are to help learners to:

a. develop a clear understanding of the concept and importance of ICTE and interrelationship among data, information, communication and education.
b. help the students to understand the social, ethical and legal issues related with ICTE.
c. develop an attitude for using technology and the internet in teaching-learning and professional development.
d. acquire skills in preparing lesson based tutorial with the help of ICT.
e. identify the facilities and possibilities of ICTE in Bangladesh, in compare with global perspective.

5. Course Content **Contact Hours**

Unit-1: ICT Today: An Overview **5**

Learning Outcomes

After successful completion of the unit, students will be able to-

a. explain the basic concepts of ICT in the 21st century perspective
b. describe the effective use of ICT across the disciplines

Content:

Concepts of IT, ICT, ICTE, Information literacy, Blended learning, Concepts of TPACK model, Scope and challenges of ICT integration in Education, ICT in Science, Engineering, Mathematics, Social Sciences and Arts, Basics of E-Education, E-Commerce, E-Governance.

Unit-2: ICTE in Bangladesh **5**

Learning Outcomes

After successful completion of the unit, students will be able to-

a. analyze local and global perspective of ICTE.
b. synchronize the relationship between ICTE curriculum and instructions.

Content:

ICTE in Global Perspective, ICTE in Bangladesh Perspective, Review of national policies regarding ICT integration in Education,Current practices of ICTE by GoB and NGOs, Future modalities of ICTE in Bangladesh.

Unit-3: Internet and Technology Assisted Learning in Education **6**

Learning Outcomes

After successful completion of the unit, students will be able to-

a. explain the use of technology as a tool in education
b. clarify the scope and challenges of digital media

Content:

Distance/Cloud in learning and teaching, Educational provisions through internet (i.e. Google Classroom, Moodle, Flipped learning, Video conferencing, Web 3.0, OER), Challenges of digital divide, D-classrooms and E-universities, Learning through digital kit, devices and online platforms/courses.

Unit-4: Educational Management Information System (EMIS) **5**

Learning Outcomes

After successful completion of the unit, students will be able to-

a. explicate the concept of MIS in education institution.
b. practice MIS in education institution.

Content:

Introduction to MIS, EMIS, Data and information, Sources and types of Information, Information gathering techniques, Information processing cycle, Information storage structure of educational institutions, Integrity and security of automated education system.

Unit-5: Ethics and Laws of ICTE **3**

Learning Outcomes

After successful completion of the unit, students will be able to-

a. describe the social and ethical issues related to ICTE
b. recognize the legal issues related to ICTE

Content:

E-Ethics: Viruses, Intellectual Property Rights, Plagiarism, Technology addiction, Digital Crime, Cyber bullying, Censorship and Privacy in digital communication, ICT Acts and Laws: Bangladesh and Global perspective.

Unit-6: Practical

Learning Outcomes

After successful completion of the unit, students will be able to-

a. develop hands-on tutorial
b. apply educational software for teaching and professional development
c. develop educational websites

Lab-1: Internet in Education **3**

Google Drive, Google Forms, Google Classroom, Moodle

Lab-2: Interactive Tutorial Development **4**

Lesson based Tutorial Development: Prezi, Video Editor (Movie Maker), Photo Editor (i.e. LunaPic, Picasa etc.)

Lab-3: Software in Teaching-Learning and Professional Development 4

UNESCO Toolkit, Learning Games: Kahoot, WikiVersity, Open Learning Sources (Courseware)

Lab-4: Educational website development 5

Basic website development using web programming

6. Instructional Strategies

a. Lecture
b. Question-Answer
c. Demonstration
d. Investigation in individually and group.
e. Assignment

7. Assessment **Marks (%)**

a. One In-course examination	10X1=	10
b. Course final Examination	(MCQ+Essay Type) 10+30 =	40
c. Assignment/ Project		10
d. Practical		40

8. Recommended Books, Journals and Reports

Standard Books will be followed on both Theory and Lab Classes. There are several books and interactive CDs on ICT and their implementation in Education, Database and Multimedia Systems, Internet E-Mail and Web designing. So students are advised to collect and read as many books as they can. Here is given a list of some standard books for collection.

1. Rahman, M, L. & Hossain, M.A. (1998). *Computer Fundamentals*, Dhaka: Systech Publication.
2. Curtin, D, P., Sen, K., Morin, C. (1998). *Information Technology*, USA:McGraw Hill.
3. Salam, M,A. (2019). *Information Communication Technology in Education: Today and Tomorrow*. Dhaka: SAM Press and Publications.
4. Awad, E, M. (1999). *Systems Analysis and Design*, New Delhi: Galgotia Publications (p) Ltd.
5. Banu, S. (2000). *Computer and Internet: their Educational Uses*. Dhaka:Papyrus.
6. Recently Published software application based book,
7. Related websites.

1. Course Number and Title: SMTE-544: Innovations and Improvement in Science, Mathematics and Technology Education

2. Credit Hours: 3

3. Course Description

This course is designed with a view to providing students with knowledge and understanding of improvement in Science, Mathematics and Technology Education through innovation. This course includes fundamental ideas of innovation, along with detailed discussion on innovation in curriculum and other instructional materials and teaching-learning strategies. This course has a strong focus on improving Science, Mathematics and Technology education through using ICTs.

4. Course Objectives

The objectives are to help learners to:

a. Understand concepts and importance of innovation.
b. acquaint with innovations in science and mathematics textbooks and teachers' guides.
c. apply innovative teaching learning strategies in science and mathematics classroom.
d. understand use of ICTs in Science, Mathematics and Technology education.
e. apply ICTs in science and mathematics classroom.

5. Course Contents **Contact Hours**

Unit-1: Fundamentals of Innovation and Improvement **8**

Learning Outcomes

At the end of this unit learners will be able to-

a. Explain innovation, its concept, types, attributes, roles and significance
b. Analyze models of changes and innovations and which lasts longer
c. Critically analyze the recent innovations and changes initiated in SMTE

Content:

- Concept of innovation
- Role and significance of research and innovation in improvement of a process or product
- Different types of innovation.
- Attributes of innovation
- Which innovation lasts? Models of changes- CBAM
- Barriers of innovation
- Examining recent innovations and changes introduced in Science, Mathematics and Technology Education

Unit-2: Innovations in Curriculum and Instructional materials **8**

Learning Outcomes

At the end of this unit learners will be able to-

a. Identify and explain the innovations in curriculum and textbooks developed by NCTB

b. Evaluate science and mathematics textbooks in respect to organization and presentation of content, reflection of nature of Science and Scientific Inquiry in Science Textbook, reflection of nature of Mathematics in Mathematics textbooks
c. Analyze textbooks for students book developed by other organizations
d. Explain innovations made in teachers' guide

Content:

- Innovations in Curriculum and textbooks developed by NCTB
- Analyzing Science and Mathematics Textbook – organization and presentation of content, reflection of nature of Science and Scientific Inquiry in Science Textbook, reflection of nature of Mathematics in Mathematics textbooks.
- Textbook/students' book developed by other organizations
- Innovations in teachers' guide: JICA teaching package as an example

Unit-3: Innovations in teaching-learning of Science, Mathematics and Technology 8

Learning Outcomes

At the end of this unit learners will be able to-

a. Critically analyze innovative teaching learning strategies based on social constructivism
b. Evaluate inquiry based teaching in SMTE
c. Analyze teaching science with analogy
d. Apply team teaching and student centered approach

Content:

- Innovative teaching strategies based on social constructivism- POE, 5E....
- Inquiry based teaching in Science, Mathematics and Technology Education
- Teaching Science with Analogy
- Team Teaching
- Students centered approach in SMTE- Poyla's 4 stages method, EEE

Unit-4: ICT in SMTE 8

Learning Outcomes

At the end of this unit learners will be able to-

a. Apply ICT in classroom
b. Evaluate ICT in different steps of investigation
c. Explain Web 2.0 for SMTE, Virtual experiment and Online and Blended learning

Content:

- ICT in classroom: Using ICT in conducting a class, Digital content, Use of smartboard (with software)
- ICT in different steps of an investigation
- Digital textbook/ e textbook
- Web 2.0 for SMTE
- Virtual experiment
- Online and Blended learning

Unit-5: Critical and Creative thinking in Science classroom 8

Learning Outcomes

At the end of this unit learners will be able to-

a. Evaluate critical and creative thinking in science classrooms
b. Critically analyze scientific thinking skills
c. Apply creativity in science classrooms and education

Content:

- Critical and creative thinking in the Science classroom
- Scientific thinking skills – Basic Science thinking skills and Integrated Science thinking skills
- Strategies for fostering thinking skills
- Creativity in Science
- Creativity in Science Education
- Fostering creativity in Science classroom

6. Instructional Strategies

a. Total classes: 24
b. Strategies: Lectures, Discussion, Group work, Assignment, Presentation.

7. Assessment

	Marks (%)
a. One In-course examination	10
b. Students' analytical and reflective work (combination of at least two of tasks (i) assignment, (ii) project, (iii) term paper, (iv) presentation, (v) review paper, (vi) field work)	40
c. Course final Examination (MCQ+Essay Type)	10+40= 50

8. Recommended Books, Journals and Reports

1. American Association for the Advancement of Science [AAAS] (1990), *Science for all American Online*, retrieved at http://www.project2061.org/publications/sfaa/online/sfaatoc.htm
2. Hassard, J. (2005), *The Art of Teaching Science: Inquiry and Innovation in Middle School and High School*, New York: Oxford University Press
3. Peters, J. M. & Stout, D. L. (Eds.), *Science in Elementary Education: Methods, Concepts, and Inquiries*. Upper saddle river: Pearson, Merill, and Prentice Hall.
4. Venville, G. & Dawson, V. (Eds). (2004). *The Art of Teaching Science,* Crows Nest: Allen &Unwin.
5. Venville, G. & Dawson, V (Eds). (2007). *The Art of Teaching Primary Science,* Crows Nest: Allen &Unwin.
6. Venville, G. & Dawson, V. (Eds). (2012). *The Art of Teaching Science for middle and secondary schools (2nd edition),* Sydney: Allen &Unwin.

৭. রহমান, এস এম হাফিজুর, সিদ্দিকী, মোহাম্মদ নূরে আলম, জলিল, মো: আবদুল, ইব্রাহীম, মুফতি মো: (২০১৪), প্রাথমিক বিজ্ঞান: বিষয় জ্ঞান ও শিক্ষণ বিজ্ঞান, ময়মনসিংহ: জাতীয় প্রাথমিক শিক্ষা একাডেমী

৮. জাতীয় শিক্ষাক্রম ও পাঠ্যপুস্তক বোর্ড (২০১৩), জাতীয় শিক্ষাক্রম ২০১২ (ষষ্ঠ-দ্বাদশ), ঢাকা: জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড

৯. জাতীয় শিক্ষাক্রম ও পাঠ্যপুস্তক বোর্ড (২০১৩), প্রাথমিক স্তরের শিক্ষাক্রম ২০১২ - প্রাথমিক বিজ্ঞান, ঢাকা: জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড

১০. আসগর, আলী; হক, আনোয়ারুল, হক; জাহান আরা, কাজী আফরোজ, ও সিদ্দিকী, মোহাম্মদ নূরে আলম, (২০১৩), প্রাথমিক বিজ্ঞান- তৃতীয় শ্রেণি, ঢাকা: জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড

১১. আসগর, আলী; হক, আনোয়ারুল, হক; জাহান আরা, কাজী আফরোজ, ও সিদ্দিকী, মোহাম্মদ নূরে আলম, (২০১৪), প্রাথমিক বিজ্ঞান- তৃতীয় শ্রেণি [পরিমার্জিত সংস্করণ], ঢাকা: জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড

এবং

১২. জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড কর্তৃক প্রকাশিত/অনুমোদিত চতুর্থ শ্রেণি থেকে দ্বাদশ শ্রেণি পর্যন্ত বিজ্ঞানের বইসমুহ

1. Course Number and Title: SMTE-545: Instructional Materials in Science, Mathematics and Technology Education

2. Credit Hours: 3

3. Course Description

This course is designed to equip teachers with knowledge, skills and attitudes related to development, selection and effective use of instructional materials for teaching Science, Mathematics and Technology. This course includes fundamentals of instructional materials which will form a base for further exploration on development, selection and effective use of instructional materials for teaching Science, Mathematics and Technology. Special emphases are placed on quality textbooks and teachers' guide, ICT based instructional materials and low cost materials for teaching and learning.

4. Course objectives

The objectives are to help learners to:

a. identify different types of instructional materials.
b. development, selection and effective use of Non-projected materials for teaching Science, Mathematics and Technology.
c. development, selection and effective use of textbooks and teachers' guide for teaching Science, Mathematics and Technology.
d. development, selection and effective use of projected and electronic materials for teaching Science, Mathematics and Technology with an emphasis on using ICTs.
e. development, selection and effective use of improvised and low cost instructional materials.

5. Course Content **Contact Hours**

Unit-1: Fundamentals of Instructional Materials **7**

Learning Outcomes

At the end of this unit learners will be able to-

a. Explain the concept, classification and effect of instructional materials
b. Critically analyze Dale's cone of experience
c. Select instructional materials by applying principles and appropriate considerations

Content:

- *Concept of instructional materials*
- *Dale's Cone of Experience*
- *Effect of using* Instructional Materials on students' learning
- Classification of instructional materials based on different criteria:
- Projected and electronic materials (Audio, Visual, Audio-visual, ICT), Non-projected materials (textual and non-textual materials, Realia)
- Easily procured and readily used resources, resources requiring some forward planning, resources requiring careful planning well in advance

- Materials within the school and materials within the community
- Commercially available materials and Low cost local materials
- Phenomenal and Manipulative (Inquiry based) Materials
- General Principles and requirement for the Selection of instructional materials
- General principles of effective use of instructional materials

Unit-2: Development, selection and effective use of Non-projected materials for teaching Science, Mathematics and Technology 7

Learning Outcomes

At the end of this unit learners will be able to-

a. Critically analyze selection and use of non-projected materials
b. Apply effective non-projected materials considering the attributes of them

Content:

- Selection and use of non-projected materials
- Chalkboard and white Board
- Flannel board and Magnet board
- Flipboard, Charts and Wall-Charts
- Posters and Pictorial Materials
- Realia and Models
- Graphs, grid board, geo board and algebra tiles

Unit-3: Development, selection and effective use of Non-projected print materials Textbooks in Science and Mathematics 7

Learning Outcomes

At the end of this unit learners will be able to-

a. Critically analyze the characteristics and process of development of science and mathematics textbook
b. Logically determine the differences among textbook, module, teachers' guide/manual and Teacher Edition textbooks
c. Evaluate and develop science and mathematics textbook

Content:

- Characteristics of Science and Mathematics Textbooks: Primary, Junior Secondary, Higher Secondary
- Process of Science and Mathematics textbook development in Bangladesh.
- Criteria of good Science and Mathematics textbooks
- Evaluation of Science and Mathematics textbooks.
- Differences among textbook, module, teachers' guide/manual and Teacher Edition textbooks
- Instructional Use of Textbooks, Teacher's Guide/manual and Teacher Edition textbooks

Unit-4: Development, selection and effective use of Projected and electronic materials for Teaching Science, Mathematics and Technology **7**

Learning Outcomes

At the end of this unit learners will be able to-

a. Apply the projected and electronic materials concerning their effectiveness
b. Evaluate instructional use of computers

Content:

Audio: Radio, Tape recorders, MP3/MP4

- Visual: Specimens, Charts, Models, Posters, Photographs
- Audio Visual: Cinema, TV, VCD, DVD, VTR, Multimedia
- Instructional Use of Computers:
  - Drill and Practice
  - Tutorial
  - Simulation and virtual laboratory
  - Problem solving Instructional games,
  - Instructional support and Material production.
  - Virtual Manipulatives
  - Use of Mathematical software- Geogebra

Unit-5: Development, selection and effective use of Low Cost materials for Science, Mathematics teaching **7**

Learning Outcomes

At the end of this unit learners will be able to-

a. Explain the concept and importance of low cost instructional materials with examples
b. Prepare and present Improvised and low cost instructional materials effectively

Content:

- Concept of low cost materials, Importance/value of use
- Improvised and low cost instructional materials: Preparation and Presentation
- Examples of different low cost materials
- Quality control and Evaluation of Improvised and low cost instructional materials.

Unit-6: Practical **5**

Learning Outcomes

At the end of this unit learners will be able to-

a. Develop a low cost instructional material
b. Evaluate Instructional materials in Science and Mathematics

Content:

- Development of a low cost instructional material
- Evaluation of Instructional materials in Science and Mathematics

6. Instructional Strategies

Total classes: 24
Strategies: Lecture with Discussion, Group discussion, Presentation, Practical

7. Assessment **Marks (%)**

a. One In-course examination 10
b. Students' analytical and reflective work 40
(combination of at least two of tasks (i) assignment, (ii) project, (iii) term paper, (iv) presentation, (v) review paper, (vi) field work)
c. Course final Examination (MCQ+Essay Type) 10+40= 50

8. Recommended Books, Journals and Reports

1. American Association for the Advancement of Science [AAAS] (1990), *Science for all American Online,* retrieved at http://www.project2061.org/publications/sfaa/online/sfaatoc.htm
2. Hassard, J. (2005), *The Art of Teaching Science: Inquiry and Innovation in Middle School and High School,* New York: Oxford University Press
3. Peters, J. M. & Stout, D. L. (Eds.), *Science in Elementary Education: Methods, Concepts, and Inquiries*. Upper saddle river: Pearson, Merill, and Prentice Hall.
4. Venville, G. & Dawson, V. (Eds). (2004). *The Art of Teaching Science,* Crows Nest: Allen &Unwin.
5. Venville, G. & Dawson, V (Eds). (2007). *The Art of Teaching Primary Science,* Crows Nest: Allen &Unwin.
6. Venville, G. & Dawson, V. (Eds). (2012). *The Art of Teaching Science for middle and secondary schools (2nd edition),* Sydney: Allen &Unwin.

৭. রহমান, এস এম হাফিজুর, সিদ্দিকী, মোহাম্মদ নূরে আলম, জলিল, মো: আবদুল, ইব্রাহীম, মুফতি মো: (২০১৪), প্রাথমিক বিজ্ঞান: বিষয় জ্ঞান ও শিক্ষণ বিজ্ঞান, ময়মনসিংহ: জাতীয় প্রাথমিক শিক্ষা একাডেমী

৮. জাতীয় শিক্ষাক্রম ও পাঠ্যপুস্তক বোর্ড (২০১৩), জাতীয়শিক্ষাক্রম ২০১২ (ষষ্ঠ-দ্বাদশ), ঢাকা: জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড

৯. জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড (২০১৩), প্রাথমিক স্তরের শিক্ষাক্রম ২০১২ - প্রাথমিক বিজ্ঞান, ঢাকা: জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড

1. Course Number and Title: SMTE-546: Research on Advancement in Science, Mathematics, and Technology Education

2. Credit Hours: 3

3. Course Description

This course has been designed to provide students opportunities for exploring advancement of Science, Mathematics and Technology Education. This course has two parts: in first part students will conduct a critical review of literature on a chosen Advancement in Science, Mathematics and Technology Education. Then they will complete a project work on a given topic of Science, Mathematics and Technology Education.

4. Course objectives

The objectives are to help learners to:

a. critically analyze literature on recent advancement in Science, Mathematics and Technology Education.
b. understands contemporary research focus in Science, Mathematics and Technology Education.
c. critically examine an issue in Science, Mathematics and Technology Education.

5. Course Content **Contact Hours**

Unit-1 : Critical review of literature on Advancement in Science, Mathematics and Technology Education **20**

Learning Outcomes

At the end of this unit learners will be able to-

a. Produce a criticalreview of literature on recent Advancement in Science, Mathematics and Technology Education

Content:

Literature on different areas of Science, Mathematics and Technology education will be explored with mutual understanding between individual student and course teacher. A few of the suggested areas are:

- Research on Organization of programs/curricula on SCIENCE, MATHEMATICS AND TECHNOLOGY Education
- Research on teaching-learning of SCIENCE, MATHEMATICS AND TECHNOLOGY
- Research on assessing students learning including international assessment initiative such as TIMSS and PISA
- Research on effectiveness on different innovative projects to improve SCIENCE, MATHEMATICS AND TECHNOLOGY education

Unit-2: Completion of a project work **20**

Learning Outcomes

At the end of this unit learners will be able to-

a. Complete a small-scale project work on a given issue of SCIENCE, MATHEMATICS AND TECHNOLOGY Education

Content:

- Individual students will complete a small-scale project on an issue selected by student in consultation with the course teacher

6. Instructional Strategies

Strategies: Discussion, Group work, Presentation.

1. Assessment

Assignment (40), project report evaluation (60)

2. Recommended Books, Journals and Reports

1. American Association for the Advancement of Science [AAAS] (1990), *Science for all American Online*, retrieved at http://www.project2061.org/publications/sfaa/online/sfaatoc.htm
2. Hassard, J. (2005), *The Art of Teaching Science: Inquiry and Innovation in Middle School and High School*, New York: Oxford University Press
3. Peters, J. M. & Stout, D. L. (Eds.), *Science in Elementary Education: Methods, Concepts, and Inquiries*. Upper saddle river: Pearson, Merill, and Prentice Hall.
4. Venville, G. & Dawson, V. (Eds). (2004). *The Art of Teaching Science*, Crows Nest: Allen &Unwin.
5. Venville, G. & Dawson, V (Eds). (2007). *The Art of Teaching Primary Science*, Crows Nest: Allen &Unwin.
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৮. জাতীয় শিক্ষাক্রম ও পাঠ্যপুস্তক বোর্ড (২০১৩), জাতীয় শিক্ষাক্রম ২০১২ (ষষ্ঠ-দ্বাদশ), ঢাকা: জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড

৯. জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড (২০১৩), প্রাথমিক স্তরের শিক্ষাক্রম ২০১২ - প্রাথমিক বিজ্ঞান, ঢাকা: জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড

১০. আসগর, আলী; হক, আনোয়ারুল, হক; জাহান আরা, কাজী আফরোজ, ও সিদ্দিকী, মোহাম্মদ নূরে আলম, (২০১৩), প্রাথমিক বিজ্ঞান- তৃতীয় শ্রেণি, ঢাকা: জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড

১১. আসগর, আলী; হক, আনোয়ারুল, হক; জাহান আরা, কাজী আফরোজ, ও সিদ্দিকী, মোহাম্মদ নূরে আলম, (২০১৪), প্রাথমিক বিজ্ঞান- তৃতীয় শ্রেণি [পরিমার্জিতসংস্করণ], ঢাকা: জাতীয় শিক্ষাক্রম ও পাঠ্যপুস্তক বোর্ড

এবং

১২. জাতীয় শিক্ষাক্রম ও পাঠ্য পুস্তক বোর্ড কর্তৃক প্রকাশিত/অনুমোদিত চতুর্থ শ্রেণি থেকে দ্বাদশ শ্রেণি পর্যন্ত বিজ্ঞানের বইসমুহ