

PART I B OPTIONAL PAPER**Paper VII – APPLICATION PEDAGOGY OF SCIENCE EDUCATION****Course Code: 907.7
COURSE OUTLINE**

Contact Hours: 108 hrs
Duration of Exam: 3 hrs.

Max. Weight: 32
No. of credits : 4

COURSE OBJECTIVES

- ❖ To acquaint student teachers with the strategies and models of teaching for future improvement.
- ❖ To equip the student teachers for meeting the needs of individual learners.
- ❖ To know about the scope of information technology in science education.
- ❖ To familiarize the student teachers with the internet and e-learning concepts.
- ❖ To understand the strategies for providing motivation in science classroom.
- ❖ To equip the students for designing dynamic instructional strategies for science education.
- ❖ To empower and energize for facing challenges of information technology.
- ❖ To envision a holistic approach towards science education.
- ❖ To develop research attitude among student teachers.
- ❖ To understand the research findings in science education for improving practices related to science education.

COURSE CONTENT**Unit I: Psychological Bases of Science Education (15 hrs)**

- a. Psychological approach in Science education
- b. Motivation and Transfer of Learning in Science class rooms.
- c. Metacognition in Science learning.
- d. Contributions of Piaget, Bruner, Gagne, Vygotsky, Ausubel and Gardner. Implications for Science teaching and learning.

Unit II: Instructional Dynamics of Science Education (30 hrs)

- a. Approaches : Process and Product Approach by AAAS, Enquiry Approach, Schwab's stable and Fluid Enquiry Approach, Pure Discovery and Guided discovery Approach, Environment Approach, Inductive – Deductive Approach, Conceptual – Factual Approach, Constructivist Approach, Issue Based Approach, Self Directed Learning.
- b. Models: Cognitive growth model, Concept Attainment model, Advance Organizer model, Inquiry Thinking model, Inductive thinking model, Creativity learning model, Tobin – Capie process model, Reflective teaching model. Inquiry Teaching Model – 5E, 7E & Generative Learning Model, Inquiry training model.
- c. Strategies: Problem Solving, Concept mapping, Mind mapping, Teaching portfolio, Brain storming, Simulation, Analogies, Mnemonics, Problem based learning, Brain based learning, Blended strategies. Using graphic organizers for Science Education.

Unit III: Need Based Science Education (15 hrs)

- a. Needs of the individual-PSI, Programmed Learning, Modules, Contract Learning, Auto Lecture, Tapping the hidden curriculum in Work Experience. Enrichment programmes for the gifted in Science.
- b. Needs of the society : Peer Tutoring, Team Learning, Community Based Science Teaching, Bringing social issues to Science classrooms.

Unit IV: Impact of Information Technology (20 hrs)

- a. Impact of IT, Application of CAI/CAL, CBI/CBT, CMI.
- b. IT for secondary storage – CD/Floppies and Pen drives, Virus and Antivirus Programmes.
- c. Multimedia Equipments – Power Point presentation, Microphone, Printer, Scanner, Digital Camera, Web camera, Joystick, LCD, DVD, Handheld computers.
- d. Use of IT for Science learning.
- e. Familiarising with Internet : www,modems, TCP/IP.
- f. Impact of smart classes in Education.
- g. Utilizing major services of the internet: Browsing educational sites, Email, Voice mail, News Group chat, Search engines for Science learning.
- h. Validation of information on the web.

Unit V: Weaving E learning into Science Classroom (18 hrs)

- a. Scope of EDUSAT in the teaching learning process.

- b. Web based classroom learning process, online learning, web tools for schools-blogs, RSS, Podcasting, Wikis.
- c. Virtual Learning – Educational Value, factors promoting it, Problems of Virtual classrooms and their solutions, Virtual Libraries and Virtual References.
- d. Scope of e- journals, e- books, e- projects and e- portfolios to nourish the Science Education. Computer programs/used in virtual classrooms-linux, ubuntu, moodle, IT @ school mission.
- e. M learning
- f. Tele conferences.

Unit VI: Research Perspective (10 hrs)

- a. Review of research done in areas – Variables related to Science Achievement, Studies on Science Curricula, Efficiency of instructional models and other Strategies.
- b. Science Education areas in which more research is needed.
- c. Developing Research Attitude : Research Journaling.

Advanced Practicum (Any 2 items – One from each part)

(10 marks)

PART - A

1. Preparing an instructional module on any topic in Science.
2. Preparing lesson transcript based on any two innovative techniques.
3. Familiarizing modern trends in lesson planning/lesson designing.

4. Preparing lesson designs which differentiate enquiry – inquiry learning models.

PART - B

1. Reviewing of research done in any area related to Science
2. Develop a CD/software for innovative Curriculum transaction based on the salient feature of new digital era.
3. Preparation of a multisensory learning package on any topic of your choice.
4. Suggest any 5 webresources (with web address) which enhances for the effective science instruction.

References

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Mahatma Gandhi University
M.Ed Degree (CBCSS) First Semester Education
Course Code: 907.7
Application Pedagogy in Science Education

Time : 3 hrs.

Max. weight : 32

PART A

Answer any two questions. Each question carries a weight of 4

1. Explain the role of Multimedia in Science class rooms.
2. List out different methods to cater to the needs of a heterogenous group of students.
3. Give a brief account of any 2 teaching models from information processing family and prepare a lesson design based on any one of them.
4. How will you incorporate e- learning in your research work.

[4x2=8 weightages]

PART B (Answer any 8 Questions)

Answer any 6 questions. Each question carries a weight of two.

5. Mention the significance of transfer of learning in science class room.
6. Explain Multiple Intelligence Approach.
7. Differentiate between concept mapping and mind mapping.
8. Explain the scope of IT in science learning.
9. Explain Schwab's stable and fluid enquiry approach.

10. What are the techniques you adopt for developing social concept among your students.
11. Outline the problems of virtual classrooms and suggest suitable solutions to overcome them.
12. Suggest the important areas in science education where advanced research is needed.

(2x6=12 weightages)

PART C

Answer any six questions. Each question carries a weight of one.

13. Explain M learning
14. Explain the different web tools for schools.
15. Explain hidden curriculum.
16. How will you motivate your students for self learning?.
17. Differentiate between teaching model and teaching strategy.
18. What is virtual learning
19. Mention any two thrust areas in science which need further research.
20. What is ZPD?

(6x1 = 6 credits)

PART - D

Answer all questions. Each question carries $\frac{1}{2}$ weight

21. Name any one science journal
22. What do you meant by Brain based learning?
23. What is CBI?

24. Mention any one multimedia equipment and its use.
25. What is metacognition?
26. What is PSI?
27. Write any 2 variables related to Science Achievement
28. What do you meant by ESS?
29. Mention the 4 major issues specified in the issue boned curriculum
30. Mention the syntax of Reflective teaching model.
31. What is the use of mnemonics?
32. Mention the steps of Discovery learning

(12×½ = 6 marks)