**University of Management and Technology**

**Department of Education**

**School of Social Sciences and Humanities**

**Course Outline**

|  |  |
| --- | --- |
| Course Code | **ED-** |
| Course Title | **Teaching of Science** |
| Resource Person(s) |  |
| Semester |  |
| Program | BS Education |
| Credit Hours | 3 |
| Duration | 15 weeks |
| Prerequisites | Nil  |
| Counselling Hours |  |

**Chairperson/Director signature………………………………….**

**Dean’s signature……………………………**

**Date………………………………………….**

**Course Description**

Science has become an essential and integral part of our life. Without the knowledge of basic principles, concepts, theories, and laws of science one cannot understand and explain a number of daily-life processes and many phenomena which one observes and experiences in one’s life. Hence a basic knowledge about the fundamentals of science has become a necessity of everyone. Furthermore, science is not only a knowledge rather it is an attitude towards nature in a way of thinking as well as a way of life. Keeping this in view, science has been given the status of a compulsory subject in any education system. So it is being taught even to the students of arts, literature, and social sciences. It is due to this large scale demand of science teaching that we need a large number of science teachers. These science teachers must be equipped with in-depth knowledge with full understanding and well-developed skills to communicate (teach) the concepts, principles, theories, and laws of science at the elementary and secondary levels.

**Course Learning Outcomes:**

After the completion of this course graduates will be able to:

1. Comprehend and teach theories, laws and principles of science education.
2. Apply various methods and techniques for teaching concepts of science.
3. Recognize recent trends and issues of teaching science at different level.
4. Apply the concepts of science in daily life.

**Mapping of CLOs to Program Learning Outcomes (PLOs):**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CLO’s/****PLO’s** | **CLO 1** | **CLO 2** | **CLO 3** | **CLO 4** |
| **PLO 1: Subject matter knowledge** | **✔** |  |  |  |
| **PLO 2: Human Growth and Development-** |  |  |  | **✔** |
| **PLO 3: Knowledge of Professional and Ethical Values** |  |  |  |  |
| **PLO 4: Instructional Planning and Strategies** |  | **✔** |  |  |
| **PLO 5: Students’ Assessment-** |  |  |  |  |
| **PLO 6**: **Learning Environment** |  |  |  |  |
| **PLO 7: Effective Use of Information and Communication Technologies** |  |  | **✔** |  |
| **PLO 8: Collaboration and Partnership** |  |  |  |  |
| **PLO 9: Continuous Professional Development and Code of Conduct-** |  |  |  |  |

**Teaching Methodology:**

The course will be taught using various techniques and modes including on-campus lectures, discussions, reading and writing assignments, presentations, group work, and research projects.

**Grade Evaluation Criteria**

Following are the criteria for the distribution of marks to evaluate the final grade in a semester. This is a tentative distribution, which may vary as per directions from the competent authority of UMT.

|  |  |
| --- | --- |
| **Components** | **Marks in Percentage** |
| Assignments  | 10% |
| Quizzes | 10% |
| Mid Term Exam | 20% |
| Attendance & Class Participation | 10% |
| Presentations  | 15% |
| Final Exam | 35% |
| Total | 100% |

**Recommended Text Books:**

* Gilbert, J. K., & Justi, R. (2016). *Modelling-based teaching in science education (Vol. 9)*. Switzerland: Springer International Publishing.
* Sabaq Foundation Trust 2012-2017. General Science Book for Class 9-10.
* Singh, Y.K. (2017). *Teaching of General Science.* New Dehli: APH Publishing Corporation
* Textbook Board. (2018). *General science for Class VIII*. Lahore: Textbook Board Higher Education Commission. (2012). *Methods of teaching*. Pakistan: Higher Education Commission (HEC).

**Recommended Reference Books:**

* Feden, P.D. and Vogal, R. M. (2003). Methods of teaching: Applying cognitive science to promote students learning. Boston: McGraw-Hill.
* Hoong, T. L. Leng, H. P. (2003). Lower Secondary Science 2 Singapore: SNP Panpac
* Lawson, Anton.  E.  (1995). “Science teaching and development of thinking”. California: Wadsworth publishing company.
* Peterson, A. D. C. (1965). *Techniques of Teaching: Volume 1*. Oxford: Pergamon Press.
* Qureshi, A. M. et al (2003). General Science**.** Lahore: Punjab Text Book Board.
* Rehman, Mehmooda (1999). Teaching of science and mathematics. Peshawar: Ijaz printer, Pakistan.
* Saleemi, F. (2003 b). Science 7. Lahore: Punjab Text Book Board.
* William Lewis Eikenberry (2008). The teaching of general science, The University of Chicago Press.

**Internet Resources:**

* <http://www.sabaq.pk/book-page.php?b=p&c=9-10&s=gs>
* <http://elearn.punjab.gov.pk/>
* <http://www.nativeaccess.com/teachers/links_general_science.html>
* <http://www.reachoutmichigan.org/funexperiments/quick/alphalist.html>
* <http://www.teachingideas.co.uk/science/contents.htm>
* <http://www.teachscienceandmath.com/tag/general-science-misconceptions/>
* <http://science.sciencemag.org/content/56/1451/433>
* <http://www.edu-nova.com/teaching-techniques-for-science-teachers.html>
* <http://ddceutkal.ac.in/Syllabus/MA_Education/Education_Paper_5_SCIENCE.pdf>
* <https://www.nap.edu/read/5287/chapter/>3

**Course Calendar**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Topics** |  **Reference Chapter(s)** | **Assignments & Tasks** | **CLOs** |
| 1. | **Introduction** | Outline | Activity: KWL chart | 1 |
| 2.  | **Introduction & history of science:*** + Nature, scope and importance of science education
	+ Scientific Method
	+ Scientific attitude
 | Ch.1 | Class activity | 1 |
| 3. | * + Definitions of science
	+ Sciences as product and process
	+ Branches of science
	+ Science and society
 | Ch.1 | Assignment  | 1 |
| 4. | * + Important scientist
* Science, religion and philosophy
* Limitations of science
 | Ch.1 | Class activity, Assignment | 1 |
| 5 | **Aims and objectives of teaching science*** Aims of teaching science,
* Objectives of teaching science,
* Difference between aims and objectives.
 | Ch. 2 | Quiz 1Class activity | 1 |
| 6 | **Methods used in the teaching of science** * Expository method
* Laboratorial or practical method
* Logical puzzles
* Demonstration
* Discussion method
* Problem solving method
* Project method
* Modeling
* Discovery and inquiry method
* Modular instruction
* Activity base
 | Ch. 3 | Assignment | 2, 3 |
| 7 | **Use of A.V-aids in teaching science*** Importance of teaching aids
* Activities in science classrooms
* Different types of teaching aid material.
 | Ch. 3 | Assignment | 2, 3 |
| 8 | **Mid Exams** |  |  |  |
| 9 | **Lesson Planning*** What is lesson plan,
* Lesson planning,
* Planning and preparing lesson plan,
* Lesson management,
* Elements of a quality lesson plan
 | Ch. 4 | Class activity | 2 |
| 10 | * Lesson planning
 | Ch. 4 | Presentation | 3, 4 |
| 11 | **Apparatus and Equipment:** * Introduction, role of laboratory,
* Locally produces low cost equipment,
* Improvised Apparatus
 | Ch. 5 | PresentationQuiz 2 | 2 |
| 12 | **The Science Teacher:** * Ideal science teacher, characteristics,
* Duties and Responsibilities of a science teacher,
* Effective use of science Laboratory,
* Making science teaching more Interesting.
 | Ch.6 | Assignment | 2 |
| 13 | **Evaluation in Science:*** Designing of Test,
* Evaluation of Functional skills,
* The Assessment of Practical work.
 | Ch.7 | Class activity  | 2 |
| 14 | **New Trends in Science Teaching*** CAI and ICT in science teaching
* Science technology and society
* New trends in teaching of science
 | Ch.8 | Assignment | 3 |
| 15 | **Final Exams** |  |  |  |

**Mapping of CLOs to Direct Assessments**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **CLOs▼** | Quiz 1 | Quiz 2 | Assignment | Presentation | Class Activity | Mid Exam | Final Exam |
| 1 | ✔ |  | ✔ |  | ✔ | ✔ | ✔ |
| 2 |  | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 3 |  |  | ✔ | ✔ |  | ✔ | ✔ |
| 4 |  |  |  | ✔ |  |  | ✔ |