

**BROCHURE**  
**Preparatory Program**  
**Academic Year 2021/22**



\*For digital version of this file please see the following link:

[http:// www.adpoly.ac.ae/En/Academics/AcademicSupport/Preparatory.aspx](http://www.adpoly.ac.ae/En/Academics/AcademicSupport/Preparatory.aspx)

## What is the Preparatory program?

Candidates who are given conditional admission to ADPOLY because of their performance in the EmSAT will be able to participate in the preparatory program for the academic year 2021/2022 at the beginning of semester 1 and semester 2. It is a full-time program which consists of 4 courses (MATH, PHYSICS, CHEMISTRY and ICT) that are given to the students as separate courses throughout the corresponding semester. The courses are zero credit and have the following codes in the banner system in ADPOLY:

### Timing of the Program Academic year 2021/22

#### Semester 1 starts at 22-Aug-2021

MATH1000 Preparatory Math  
PHYS1000 Preparatory Physics

ICT1000 Preparatory Computer  
Science

#### Semester 2 starts at 10-Jan-2022

MATH1000 Preparatory Math  
PHYS1000 Preparatory Physics  
CHEM1000 Preparatory Chemistry  
ICT1000 Preparatory Computer  
Science

### General Characteristics of the program

- **Admission**

New enrolled students are admitted to the Preparatory Program if they haven't met the minimum requirements of grade 1100 for Applied Bachelor (AB) in each of EmSAT subjects: Mathematics, and two topics of three: Physics, Chemistry or Computer Science. They will be given the chance to take the above courses and/or re-sit again for the EmSAT to be qualified to enter ADPOLY AB programs.

- **Placement**

Students who don't meet the minimum EmSAT are placed in intensive courses of Mathematics, Physics, Chemistry and Computer Science.

- **Duration**

The Preparatory Program has the same duration as any other course in ADPOLY which is the length of the whole semester, but it has zero credit weight. The grade will be either Pass/Fail. If the student obtains the required EmSAT score, he/she can drop the course at any time.

**The Preparatory Program consists of 4 courses in MATH, PHYSICS, Chemistry and ICT for students who get less than 1100 in the above EmSAT Topics**

### MATH 1000

Topics Covered in this course are Algebra, trigonometry, and geometry. However, the focus will be to Algebra which is fundamental to advance courses in mathematics and to physics and chemistry. Hence the objectives of the course are the following:

#### Algebra: (MAIN Focus)

- Understand basic concepts of algebra including operations on real numbers and operations on polynomials.
- Approximate numbers and scientific notations
- Algebraic operations on expressions and equations
- Concept of a function and various functions properties and their graphs
- Solving linear and quadratic equations
- Solving logarithmic and exponential equations.

#### Trigonometry:

- Concept of trigonometric functions, signs of any angle and properties of right triangle
- Radian measure and applications

#### Geometry:

- Areas of triangles and circles and volumes of spheres and cylinders

#### How to Prepare for the course:

- **Learning methodology**

On campus class lectures and tutorial.

- **Resources**

Students are encouraged not to limit themselves to lectures in class, and to look for online resources: Suggested online resources are:

Khan Academy: <https://www.khanacademy.org/math/algebra-home>

World Center of mathematics: <https://www.youtube.com/user/CenterofMath>

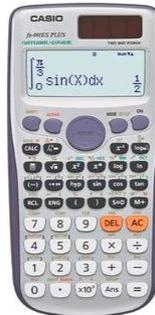
- **Reference books:**

- Washington, A. (2009) Basic Technical Mathematics with Calculus, Prentice Hall, 9th Edition.

- Wallace, T. (2010) Beginning and Intermediate Algebra, <http://wallace.ccfaculty.org/book/book.html>
- Sullivan, M. (2015) Precalculus, Prentice Hall, 10th Edition.

- **Calculator**

The scientific calculator (Casio FX-991ES Plus, or Similar) is the standard tool for math calculations throughout the course.



- **What Happens Before the start and before the end of the preparatory math course?**

Two major assessments will be given for the students during the semester and final exam at the end of the course to measure the development of the candidates.

### Physics 1000

The objective of the course is to develop student understanding and skills in solving problems in fundamental concepts of mechanics and to concepts related to translational motion. As this topic is the basis for any other advance concepts in mechanics. Hence, a minimum focus will be related to rotational motion and fluid mechanics.

The following points summarizes the main objectives covered in this course:

#### Translational Motion (MAIN FOCUS):

- Apply the equations of motion to solve 1D and 2D projectile questions.
- Understand Newton's laws of motion and to solve mechanics problems.
- Use conservation of mechanical energy, work and power in solving problems.
- Develop student understanding and skills in fundamental concepts related to law of conservation of momentum in 1D and 2D.

#### Rotational Motion:

- Develop student understanding and skills in fundamental concepts related to rotational motion, the principles of conservation of angular momentum, and impulse

#### Fluid Mechanics

- Fundamentals of fluid mechanics: density. Static pressure. Pressure gauges. Buoyancy. Bernoulli's equation. Real fluids (viscosity and turbulence)

#### Texts/References

- Sears and Zemansky's College Physics, 9th edition, Hugh D. Young, 2011.

#### What Happens Before the start and before the end of the preparatory physics course?

Two major assessments will be given for the students during the semester and final exam at the end of the course to measure the development of the candidates.

### Computer Science (ICT 1000)

Computer fundamentals is an introductory course in the field of Computer Science/Information Technology. This course aims to develop students' knowledge and understanding of the fundamental concepts of computing. The topics included in the course are: [1] Computer Hardware, [2] Digital Logic Design, [3] Computer Networks, [4] Computer Security, [5] Computer Software, [6] Problem Solving, and [7] Basic Programming. Upon completion of the course, students should be able to demonstrate an understanding on the roles and functions of computer systems and use python as programming language to computer and solve problems.

#### Objectives of the course are:

- Understand the basic concepts of computing and identify the various components of a computer system.
- Recognize different types of number systems as they relate to computers and convert values from one system to another.
- Familiarize with Boolean algebra and the basic types of logic gates and logic circuits.
- Explain the fundamental concepts of networking and identify the various networks types, topologies, models, and transmission media.
- Understand the computer security fundamentals and identify the risks involved.
- Explain the functions of System Software and Application Software
- Use IPO, pseudocode, algorithm, and flowchart to model problem solutions.
- Understand the basic concepts of programming in python and learn how to write a simple program.

#### Textbook

- Docter, Q. (2016). CompTIA IT Fundamentals Study Guide: Exam FC0-U51. John Wiley & Sons.

#### References:

- Shelly, B. and Vermaat E. (2014). Discovering Computers: Living in a Digital World, Cengage Learning
- Floyd, T. (2009). Digital Fundamentals, 10th edition, Pearson/Prentice Hall
- Forouzan, B. (2012) Data communications and networking. 5th edition. New York: McGraw Hill Higher Education
- Gowrishankar, S. and Veena, A. (2019). Introduction to Python Programming. CRC Press: Taylor and Francis Group

#### What Happens Before the start and before the end of the preparatory ICT course?

Two major assessments will be given for the students during the semester and final exam at the end of the course to measure the development of the candidates.

### Chemistry (CHEM 1000)

This course introduces the elementary principles of chemistry and enables students to develop their problem-solving skills and understanding of the fundamentals of chemistry which include: SI units, unit conversions, significant figures, and periodic table. Emphasizes on chemical reactions and the use of symbolic representation and nomenclature, the mole concept and its applications and molecular structure, stoichiometry and solution stoichiometry, gases law and ideal gas law, and atomic structure and periodicity and chemical bonding.

Upon completion of the course students should be able to develop student understanding and problem-solving skills in basic chemistry fundamentals needed to apply chemistry in all relevant fields for the degrees offered at the Abu Dhabi polytechnic.

#### Objectives of the course are:

- Recognize Units, definitions, and basic concepts. Atomic structure and nomenclature of simple compound. Periodic Table of Elements. Units of measurements used in chemistry.
- Counting Atoms and Molecules. Elements and compounds. Write basic chemical formulas.
- Balancing reactions and stoichiometry. Acid-base reactions. Oxidation and reduction. Chemical equilibrium. Balance basic chemical equations.
- Understand Gas laws. Pressure, gas laws of Boyle, Charles, Avogadro and Ideal Gas Law, gas stoichiometry, and Dalton's law.
- Understand the Atomic Structure and Periodicity. Bohr Model, Quantum Numbers, Electron Spin and the Pauli Principle and Aufbau Principle, Periodic Trends in Atomic Properties.
- Recognize types of Chemical Bonds and Electronegativity, Bond Polarity and Dipole Moments, Electron Configurations and Sizes, Covalent Chemical Bond, Lewis Structures.
- Understand the basic concepts of Thermochemistry. Thermal equilibrium internal energy, work pressure-volume work state functions first law of thermodynamics exothermic and endothermic enthalpy and enthalpy change calorimetry, heat capacity, specific heat Hess's law standard enthalpies of formation.

#### Textbook

- Zumdahl S. and Zumdahl S. (2013), Chemistry, 9<sup>th</sup> Edition or newer, Brooks Cole, USA.

#### What Happens Before the start and before the end of the preparatory Chemistry course?

Two major assessments will be given for the students during the semester and final exam at the end of the course to measure the development of the candidates.