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جامعة زايد
ZAYED UNIVERSITY

College of Interdisciplinary Studies

The College of Interdisciplinary Innovation prepares top students for professional leadership in the rapidly changing global environment, imparting seminal skills that can be transferred across contexts and applied in novel ways.

ICS 220 - Programming Fundamentals

Term	**202422 - 2025 Spring Semester**		
Section	**101**	CRN	**21138**
Course Pre-requisites	**ICS 215**		
Course Co-requisites			
Credit hours	**3**	Lab hours	**2**
Lecture hours	**0**	Other hours	**2 (Forum hours)**
Schedule Type	**Interdis. UG Lecture & Lab**		
Delivery Mode	**Blended**		

Instructor's Name	**Areej Abdulfattah**		
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Class Time/Location	**T 1330-1520 FIS-1-024;MW 0830-0920 ;**		
Office Location	**Online Meetings : https://zu-ac-ae.zoom.us/j/9987835491 - Office : MF1-1-048,**		
Office Hours	**Monday/Wednesday: 02:30 - 04:30 pm. Friday: 11:00 am to 01:00 pm.**		

1. Course Description

This course transitions the student's approach to problem solving from the procedural approach to the Object-Oriented (OO) approach. The transition happens by supporting students to address real-world problems by encapsulating behaviors and related attributes into a single unit - the Object. The course will enable students to analyze, design, and develop solutions by learning the OO concepts of Classes, Objects, Class Relationships, Polymorphism, and Database Management System. The concepts use the OO principles of Abstraction, Encapsulation, Association, and Inheritance, and are implemented using UML and an OO programming language.

2. Course Learning Outcomes

By the end of this course, a student will be able to:

1. Analyze and design software that map real-world entities and relationships using Unified Modelling Language (UML) notations.
2. Create working object-oriented programs in a computer language that are well-structured, error free, and can solve computational problems.
3. Develop and test interactive multi-tier software applications that ensure one or more CRUD (create, read, update, and delete) operations.
4. Communicate with a clear and precise style that is suited to an appropriate audience to produce well-documented code, design documents, and presentations that are readable and understandable.

Alignment to Program Learning Outcomes

IS_BSCPS: Computational Systems--B.S.: Bachelor of Science	**Course Learning Outcomes**
1. Computational Solutions: Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.	1
2. Computational Design: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	1, 3, 2
3. Communication: Communicate effectively in a variety of professional contexts.	4
4. Professional Practice: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.	
5. Working in Teams: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.	

3. Weekly Outline

Week	**Topic**	**Activity**
01/13 to 01/17	Launchpad and Orientation	Launchpad and Orientation
01/20 to 01/24	Unit 1 Session 1: Software Development Life Cycle (SDLC) Session 2: Lab 1 - Course Outcomes and IDE installation Session 3: Software architecture patterns	Compare SDLC and Architecture Patterns Section 1.2 of System Analysis and Design, 12th Edition, Scott Tilley, Shelly Cashman Series Section 1.7 of System Analysis and Design, 12th Edition, Scott Tilley, Shelly Cashman Series

01/27 to 01/31	Unit 1 Session 4: Programming Paradigms Session 5: LAB 2 - Review Procedural Programming Session 6: Object-Oriented Programming Paradigm	Review Procedural Programming Sections 1 to 8 of the class handout: Programming Paradigms and Object-Oriented Concepts. Sections 9 to 16, of the class handout: Programming Paradigms and Object-Oriented Sections 10.1 and 10.2, of the textbook Starting out with Python, Tony Gaddis, Pearson.
02/03 to 02/07	Unit 2 Session 7: UML Use Case - Requirement Analysis Session 8: LAB 3 - Review Use Cases and UML Class Diagrams Session 9: UML Class Diagram - Design phase	Exercises on UML Use Case diagrams Read Class handout: Requirements Analysis and Use Case Diagrams
02/10 to 02/14	Unit 2 Session 10: Class and Object Creation - Part 1 Session 11: Lab 4 - Review class and object creation in Python Session 12: Class and Object Creation - Part 2	Exercises on UML Class diagrams and OO Programming - classes and objects Assignment 1 - Introduction Read Class handout: UML Class Diagrams & Class Implementation Read Class handout: Requirements Analysis and Use Case Diagrams
02/17 to 02/21	Unit 2 Session 13: Synthesis 1 - OOAD Principles Session 14: LAB 5 - Synthesis Lab Session 15: UML - Class Relationships and OO Programming - Inheritance	Synthesis Lab - OOAD Principles Review Chapter 11 - Inheritance - Starting Out with Python by Tony Gaddis. Read Class handout: Requirements Analysis and Use Case Diagrams
02/24 to 02/28	Unit 2 Session 16: UML - Class Relationships and OO Programming - Inheritance Session 17: Lab 6 - Review UML Class Relationships and OO Programs on Inheritance Session 18: UML - Class Relationships and OO Programming - Association	Exercises on UML Class Relationships and OO Programs on Inheritance Submission of Assignment 1 Section 11.1 - Starting Out with Python by Tony Gaddis. Read Class handout: UML - Class Relationships and OO Programming – Association
03/03 to 03/07	Unit 2 Session 19: UML - Class Relationships and OO Programming - Aggregation and Composition Session 20: LAB 7 - UML Class Relationships and OO Programs on Association, Aggregation, and Composition Session 21: Collection of Objects and Functional Programming	Exercises on UML Class Relationships and OO Programs on Association, Aggregation, and Composition Assignment 2 - Introduction Read Class handout: Aggregation and Composition Read Class handout: Class handout: UML - Class Relationships and OO Programming

03/10 to 03/14	Unit 2 Session 22: Synthesis 2 - OOAD Modelling Session 23: LAB 8 - Synthesis Lab - OOAD Modelling Session 24: Polymorphism	Synthesis Lab - OOAD Modelling Read Class Handout Inheritance, association, aggregation, composition, Collection of objects, and functional programming – By Nishara Nizamuddin
03/17 to 03/21	Unit 3 Session 25: Exception Handling Session 26: Lab 9 - Exercises on Polymorphism and Exception Handling Session 27: Graphical User Interface (GUI)	Exercises on Polymorphism and Exception Handling Sections 13.1 and 13.2, of the textbook Starting out with Python, Tony Gaddis, Pearson. Sections 13.3, 13.4, and 13.5, of the textbook Starting out with Python, Tony Gaddis, Pearson
03/24 to 03/28	Spring Break	Spring Break
03/31 to 04/04	STUDENT PD WEEK & EID	PD Activities
04/07 to 04/11	Unit 3 Session 28: GUI Layout Managers Session 29: LAB 10 - Graphical User Interface (GUI) with Tkinter Session 30: Integrating GUI applications and objects	Exercises on GUI Submission of Assignment 2 Final Project - Introduction Sections 13.6, 13.7, and 13.8, of the textbook Starting out with Python, Tony Gaddis, Pearson.
04/14 to 04/18	Unit 3 Session 31: Data Storage and Access - Part 1 Session 32: LAB 11 - Data Storage and Access – Part 1 Session 33: Data Storage and Access - Part 2	Exercises on creating and managing data storage Read Class Handout: Data Storage and Access – Part 1 Read Class Handout: Data Storage and Access – Part 2
04/21 to 04/25	Unit 3 Session 34: Data Storage and Access - Part 3 Session 35: LAB 12 - Object Serialization, Data Storage and Access – Parts 2 and 3 Session 36: Software Testing	Integration and Testing Activity Read Class Handout: Data Storage and Access – Part 3 Read sections 9.3 from the textbook Starting out with Python, Tony Gaddis, Pearson.
04/28 to 05/02	Unit 3 Session 37: Synthesis 3 - OO Implementation Session 38: LAB 13 - Synthesis Lab 3 Session 39: Final Assignment Discussion	Synthesis Lab Workshop - OO Implementation Read sections 9.3 from the textbook Starting out with Python, Tony Gaddis, Pearson.
05/05 to 05/09	Final Project Workshop	Final Project Workshop

4. Pedagogy - Learning Process

4.1 Zayed University Pedagogical Framework

Zayed University is committed to a student-centered learning environment that is characterized by the following approach to teaching:

1. Active and Varied: The ZU faculty member adopts a variety of active teaching-learning strategies, tailored to each learning task and to the intended learning outcomes.
2. Collaborative and Individual: Cooperative group learning tasks, as well as individual learning tasks, are integral to each ZU course.
3. Content-rich and Language-rich: Instruction focuses on the development of in-depth knowledge, along a continuum from richer-in-language, to richer-in-content in the baccalaureate and graduate programs.
4. Facilitated by Technology: Appropriate educational technology is integrated into every ZU course.
5. Interculturally attuned: Teaching in ZU requires global awareness, sensitivity to local culture, a commitment to developing intercultural competence, and a commitment to learning from students.
6. Interpersonally oriented: Successful learning at ZU is facilitated by building positive relationships with students, while maintaining professional demeanor and holding students accountable.
7. Learner focused: The ZU faculty member evaluates and builds on learner knowledge and strengths, while addressing learner needs.
8. Practical and Theoretical: Instruction lays solid theoretical foundations, as appropriate to the level of study, while having a real-world orientation.
9. Reflective: Instructors strive to be reflective educators who enable reflective and critical learning in students.
10. Supportive:The ZU faculty member fosters student dispositions of leadership, creativity, innovation, self-responsibility, and lifelong learning in a supportive learning environment.

4.2 Teaching Method

Blended Learning

This course is designed to be taught with significant learning activities undertaken online (synchronously and/or asynchronously) and a reduced number of on-campus face-to-face classes. The online activities are a purposeful substitution of on-campus classes as determined by the college.

5. Course Text/s

Textbook				
Title	**Publisher**	**Author**	**ISBN**	**Year**
Starting Out with Python, Global Edition, 5th Edition	Pearson	Gaddis, Tony.	9780135929032; 0135929032; 9781292408637; 1292408634; 9781292408606; 129240860X	2021

Additional Learning Materials

Text Other
Other Material
https://www.geeksforgeeks.org/difference-between-mvc-mvp-and-mvvm-architecture-pattern-in-android/
https://www.guru99.com/n-tier-architecture-system-concepts-tips.html
https://searchoracle.techtarget.com/definition/object-oriented-database-management-system
https://searchoracle.techtarget.com/definition/object-oriented-database-management-system
https://www.tutorialspoint.com/python/python_multithreading.htm
https://www.tutorialspoint.com/object_oriented_python/object_oriented_python_serialization.htm
https://www.tutorialspoint.com/object_oriented_python/object_oriented_python_serialization.htm
https://www.w3schools.com/python/python_try_except.asp
https://www.geeksforgeeks.org/polymorphism-in-python/
https://www.w3schools.com/python/python_inheritance.asp
https://www.w3schools.com/python/python_inheritance.asp
https://medium.com/@dineshmadhup_75545/implementation-of-inheritance-composition-and-aggregation-in-python-aee2761cb2d0
https://medium.com/@dineshmadhup_75545/implementation-of-inheritance-composition-and-aggregation-in-python-aee2761cb2d0
https://www.w3schools.com/python/python_classes.asp
https://www.lucidchart.com/pages/uml-class-diagram/
https://stackify.com/oop-concept-for-beginners-what-is-encapsulation/
https://stackify.com/oop-concept-abstraction/
https://www.lucidchart.com/pages/uml-use-case-diagram
https://www.javatpoint.com/procedural-programming-vs-object-oriented-programming
https://www.scnsoft.com/blog/software-development-models
https://brocoders.com/blog/agile-software-development-life-cycle/

6. Assessment of Student Learning

Item	%	Description	Due Date MM/DD/YYYY	Course Learning Outcomes
Assignment 1	15	Software Modelling - UML Use Case, UML Class diagrams, and OO Programs	02/28/2025	1,2,4
Assignment 2	20	Software Implementation - OO Project	03/28/2025	1,3,2,4
Class Work	40	Throughout the semester, students will be evaluated in their active Learning in Forum sessions (Pre-Class Work; Poll Responses; Labs; Verbal Contributions; and Labs)	05/11/2025	1,3,2,4
Assignment 3	25	Software Implementation - OO Project with GUI and Data storage	05/12/2025	1,3,2,4

7. Course Policies

7.1 General Course Expectations

- You are expected to be in class on time and to remain for the scheduled class period. Classes will begin promptly at the scheduled time. You should attempt to enter your online classes early to address any connectivity issues and plan to arrive early for on-campus classes to accommodate for possible delays (traffic, parking, ID access issues, etc.) to avoid being marked absent.
- Course documents (syllabus, readings, assignments, etc.), announcements, and grades will be posted on Forum. It is your responsibility to check Forum (https://forum.uae.minervaproject.com/app) regularly and ensure you are up to date.
- For any missed class, it is your responsibility to review the recorded session (if available) and the materials from the class. You are responsible for contacting your instructor with any questions about the missed class session. You are expected to complete all assigned readings and pre-classwork, undertake the class activities on your own to learn the material, and come prepared for the next session.
- Any work submitted must be your own and strictly adhere to the Zayed University Honor Code. This applies to graded take-home assignments, pre-class work, in-class polls and activities, and any other class contribution. The use of AI, or artificial intelligence, assistance of any sort for your class work is strictly prohibited, except for cases when it is explicitly permitted in writing for a class activity or assessment.
- You are required to keep all notes, drafts, and research related to any assignment or project until the final grades for each course are announced at the end of each semester. You must be able to show how you developed your assignments over time; this is evidence that you completed the work yourself.
- For student complaints, problems and/or suggestions, please visit SAHIM (http://sahim.zu.ac.ae).

7.2 Professional Behavior Expectations

Students are expected to behave professionally. This means you are required to prepare appropriately for each class and actively participate in all of them. You should read all assigned materials, watch all assigned videos, and complete all assigned pre-class work, including solving assigned problems and answering study guide questions. You are also required to adhere to assignment guidelines and deadlines, and to contact your instructor promptly if you are not able to do so.

Instructors have the discretion to give you a 0 score for your classwork (specifically #ProfessionalEngagement) if you are not actively participating in an online or face-to-face session, even when you are technically or physically present. Such situations where an instructor may give a student a 0 score may include:

- When a student does not join the class at the scheduled time;
- When a student claims they have technology issues but has not reported these to Live Tech support or when they have failed to maintain their audio or video during class;
- When a student is taking class from a moving vehicle or other location with self-evidently unstable internet connectivity;
- When a student is demonstrating lack of engagement during the session, e.g. not responding to the instructor and/or not responding to the polls;
- When a student is turning off the camera or audio, or not being properly visible on camera (in an online session) or leaving the room or obviously not engaging in the session (in both online and face-to-face sessions);
- When a student is walking around, talking on the phone or texting, talking to others instead of participating, and any other similarly disruptive or negative behaviors.

7.3 Late Assignment Submission

You are allowed four 24-hour personal assignment deadline extensions per course.

Multiple 24-hour extensions may be applied to the same assignment, but no more than 4 total extensions are allowed per course, inclusive of family emergencies or medical reasons. This policy allows you substantial flexibility in those instances in which multiple courses have the same or similar major assignment deadlines. Not all assignments are eligible for an extension (see assignment instructions), and assignment extensions may not be used for final projects.

After the four extensions are used, or for Final Assignments, the Late Assignment Penalties below will apply:

Submission Time and Late Penalties for Assignments

- Before the submission deadline: There is no penalty.
- Up to 48 hours after the assignment submission deadline: The maximum rubric score is 4 on any LO.
- From 48 hours and one minute to 96 hours after the assignment submission deadline: The maximum rubric score is 3 on any LO.
- Up to 96 hours and one minute to 144 hours after the assignment submission deadline: The maximum rubric score available is 2 on any LO.
- More than 144 hours (6 days) after the submission deadline: The maximum rubric score available is 0 on any LO.

Submission Time and Late Penalties for Final Assignments

- Before the submission deadline. There is no penalty.
- Up to 24 hours after the assignment submission deadline: The maximum rubric score is 4 on any LO.
- From 24 hours and one minute to 48 hours after the assignment submission deadline: The maximum rubric score is 3 on any LO.
- Up to 48 hours and one minute to 72 hours after the assignment submission deadline: The maximum rubric score available is 2 on any LO.
- More than 72 hours after the submission deadline: The maximum rubric score available is 0 on any LO.

If you have documented extenuating circumstances that may prevent the completion of all of your assignments by the last day of the semester, you must petition the Assistant Dean for Student Affairs for an Incomplete grade by no later than Friday of week 15. Students who are denied an Incomplete grade (or who fail to petition for an Incomplete grade) and who do not submit their assignments will receive an F for the course.

7.4 Technology Expectations

For class sessions, you must use a laptop with a working camera that meets the recommendations circulated on enrollment in the course. Headphones are also required so you can hear well, and others can hear you when you are speaking. Technology Support Services: If you are having technology issues, you must contact Minerva Tech Support immediately via live chat through Forum or via email at helpdesk@minervaproject.com. If you are having connectivity issues with your internet service provider, you need to contact your internet service provider and have documentation regarding issues. This does not excuse absences, but can be documentation to

support your absences for a WF to W appeal (see Attendance Policy in this document).

7.5 Video Recording

Each class session will be video recorded. These recordings will be made available to students enrolled in the recorded class section so that you can view the personalized feedback written by your instructor and later review the class discussion. You must not share or distribute these recordings without the explicit written permission of your instructor.

The video recording of each class section will be made available to the students enrolled in that section shortly after the class, and will remain accessible to the students until the first day of the following academic year. Video recordings of class sessions may be viewed by employees of Zayed University and its partner/s only for legitimate university business.

Reference: ZU Policy & Procedure ACA-PRO-401 E-Learning: Online and Blended Learning

8. Grading Key

Zayed University has adopted a plus/minus grading scale for all undergraduate courses. Based on Zayed University policy, the grade points and outcome ranges are assigned to each letter grade as follows:

Outcome Average		Letter Grade
4.48	5.00	A
4.33	4.47	A-
4.18	4.32	B+
3.98	4.17	B
3.83	3.97	B-
3.68	3.82	C+
3.48	3.67	C
3.33	3.47	C-
3.18	3.32	D+
2.98	3.17	D
0.00	2.97	F

9. Attendance Policy

Attendance:

You are required to attend all classes, practical sessions, seminars, and examinations related to the courses in which you are registered. Your instructors are responsible for recording class attendance accurately on the official online register. You are responsible for checking and tracking your attendance records for each course through the Student Access Program.

You are expected to be present and/or logged in and ready to participate in class (physically in class with a laptop for in-person classes or visible on camera with functioning audio for online classes) at the designated time and to attend the entire class session.

As a reminder, to avoid unintentional absences due to lateness or technical issues, you are advised to:

- Restart your computer **every** day before classes begin
- Be at your computer and ready for classes ten minutes prior to the start of class
- Test your internet connection, video and audio prior to each class
- If you have persistent internet connectivity issues at home, plan to attend your Forum classes from campus
- Reach out to Live Tech support should tech issues occur so that they are resolved quickly

Absences:

- It is your responsibility to catch up on work missed through class absence.
- If you miss 5% of the class meetings allotted for a course you will receive a warning from the Registrar's Office.
- If you miss 10% of the class meetings allotted for a course you will receive a second warning from the Registrar's Office.
- If you miss more than 15% of the class meetings allotted for a course you will receive a **Withdrawal with Failure** (WF) grade for the course.
- **After missing 15% or more of the class meetings, you will not be allowed to continue the course and will need to re-take it in a later semester. There are no exceptions nor appeals if you fail to waive absences, in advance, properly and reach 15% absences.**

Student Appeals:

- Student appeals against receiving a WF grade for a course after exceeding the 15% absence limit, must be submitted on the Attendance Appeal e-form within three (3) working days of the student receiving the notification of the WF grade from the Registrar's Office.
- If the appeal is upheld, you will be allowed to withdraw from the course, and a grade of Withdrawn (W) will be assigned for that course.
- If the appeal is denied, the grade of Withdrawn with Failure (WF) will remain assigned for that course.

Waived Absences:

- For absences that qualify for the Absence Waiver, students must apply for the absence waiver in advance or as soon as possible following the absences. The Registrar's Office will email information regarding the Waiver Guidelines at the start of the semester. If you fail to apply for an absence waiver and reach 15% absences for a course, you will WF the course and will not be permitted to return to the course. There are no exceptions.

Reference: ZU Policy & Procedure ACA-REG-103 Attendance

10. Academic Integrity

10.1 Zayed University Honor Code

"In the Name of God Most Gracious Most Merciful"

As a student of the University that carries the name of the beloved and revered father of the nation, the late Sheikh Zayed Bin Sultan Al Nahayan (may his soul rest in eternal peace), I pledge to:

- Demonstrate the virtues of honesty, respect and fairness
- Adhere to the highest standards of personal moral conduct
- Refrain from any and all forms of academic dishonesty
- Present a positive image of myself by acting with maturity and honor
- Take responsibility for my actions and do my part to maintain a community of trust
- Dedicate myself to the achievement of the University's excellence

I promise to honor Sheikh Zayed and to preserve his legacy by following the example set by the wise and beloved father of the United Arab Emirates.

10.2 Desired Behavior

Students are expected to do their own work, citing all of the sources they use and being honest and open in all of their dealings with instructors, advisors, classmates, and administrators.

10.3 Collaboration Expectations

We strongly encourage you to discuss the ideas you learn about in class with your classmates. Learning in groups is always beneficial. However, although discussing pre-class work or assignments is acceptable, **you must produce all your assignments on your own unless otherwise indicated in the assignment instructions**. For essay assignments and research papers, you must always draft your work independently. If required as a part of the assignment, you may give and receive peer feedback on the drafts of assignments that have been completed by other students. For all other types of assignments, you may neither look at others' work, nor share work with anyone else who is not acting in an official capacity as a peer tutor or teaching assistant unless indicated in the assignment instructions. For example, while it is acceptable to discuss different approaches to a coding assignment, it is not acceptable to look at another student's code or to share code with a student who is not acting as a peer tutor for the course. In addition to violating the Honor Code, if a student submits an assignment that is not their own work, it misrepresents the student's understanding of the concepts, and prevents instructors from giving beneficial feedback.

10.4 Prohibited Behavior (Academic Misconduct)

All forms of academic dishonesty are strictly prohibited. Violators of this code are subject to university discipline. Academic dishonesty includes, but is not limited to:

1. Copying work produced by a person or generative AI tools either word for word or making some changes but keeping the structure, much of the language, and main ideas the same. Even if the work is not published, it should be treated as someone else's work and not as your own work.
2. Using the words, images, source code, ideas or any work created by someone else or generative AI tools without acknowledgment. Every source and tool used in a paper must be cited in the body of the work and also identified in the list of references.
3. Buying, borrowing, or otherwise obtaining and handing in a paper, project or course assignment as if it were your own.
4. Turning in someone else's paper as if it were your own is strictly prohibited, even if the paper is enclosed in quotation marks. A large part of a paper cannot simply be quotations.
5. Allowing someone or using AI tools, to edit, rewrite or make substantial changes in your work and turning it in as if you have done it all, without acknowledging the other person's contribution and without prior permission of the instructor.
6. Falsification of data.
7. Inventing or misrepresenting research or citations. (Whether through AI or not).
8. Representing coursework done for another course as new work without prior permission from the instructor.
9. Impersonating another student in an assessment or for class participation or using another student or AI to impersonate you.
10. Using generative AI tools in ways other than as prescribed in the official course syllabus.
11. Collaborating with others and/or using AI on assessments meant to be done on one's own, without the prior permission of the instructor.
12. Withholding or hiding shared instructional, research or AI resources.

At any time, if you think you may have unknowingly plagiarized someone's work, you should discuss this with your instructor before turning in the assignment.

10.5 University Discipline

At the discretion of your instructor, you may be required to answer questions about your assignment submission to ensure that you actually completed the assignment yourself. Any meetings that take place may be recorded. Depending on the outcome of these meetings, your case may be escalated to the College Academic Integrity Committee for further investigation and potential disciplinary action as per ZU Procedure ACA-STU-201 Student Code of Academic Integrity.

11. Students of Determination

Under UAE Federal Law; Students of Determination (Physical Disabilities and Learning Difficulties) are entitled to receive exam accommodation, such as, access to Assistive Technology, extra time, rest breaks or use of a separate room. To use this accommodation, you must register with Student Accessibility Services (SAS) where your requirements will be assessed. For registration and further information please contact:

Department of Student Accessibility Services (SAS);

Abu Dhabi, the Manager, Humaid Matter AlTayer Assistive Technology Resource Center, LB-01-037

Dubai, the Manager, Khalaf AlHabtoor Assistive Technology Resource Center, 04-GF-054.