**Department of Architecture**

**School of Architecture and Planning**

**University of Management and Technology**

**Course Outline (on OBE)**

**UMT’s Vision**

***Our Vision is... Learning***

It defines our existence, inspires all stakeholders associated with us, creates a powerful momentum inside, and responds to the challenges outside. It continues to evolve as present captures new realities and foresight to unfold new possibilities. All in an incessant attempt to help individuals and organizations discover their God-given potentials to achieve Ultimate Success actualizing the highest standards of efficiency, effectiveness, excellence, equity, trusteeship and sustainable development of global human society.

**UMT Mission**

**Our Mission is.... Leading**

We aspire to become a learning institution and evolve as the LEADING COMMUNITY for the purpose of integrated development of the society by actualizing strategic partnership with stakeholders, harnessing leadership, generating useful knowledge, fostering enduring values, and projecting sustainable technologies and practices.

**Mission of the School**

The mission of the School is to provide the best leadership in the fields of the built environment; particularly in the development, management and innovation in the fields of architecture, urban planning and related specializations and sub-specializations

**Mission of the Department**

At the Department of Architecture our mission is to challenge the participants to develop their abilities in solving complex problems by thinking creatively & informed decision making as a core of their professional schooling. Offering them a diverse interdisciplinary and meticulous program of studies led by an adroit faculty in a comprehensive studios or class environment and preparing them for leadership roles in the field of Architecture, Construction, Landscape, Built Environment and community development.

**University of Management and Technology**

**Course Outline**

Course code: **AR-514** Course title: **Construction Management and Project Scheduling**

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| Program | **Bachelors of Architecture** |
| Credit Hours | (3.0) |
| Duration | 3 hours, 1 semester(16 weeks), Fall 2022 |
| Prerequisites | N/A |
| Resource Person | Ar. M. Ilyas Malik, Ar. Allah Ditta |
| Counseling Timing  (Room# ) |  |
| Contact: | [ilyas.malik@umt.edu.pk](mailto:ilyas.malik@umt.edu.pk)  [allah.ditta@umt.edu.pk](mailto:allah.ditta@umt.edu.pk) |

**Chairman/Director signature………………………………….**

**Dean’s signature…………………………… Date………………………………………….**

**Learning Objective:**

Every Project, no matter how small or big must be handled by a qualified Project Manager, while the project manager does not do all of the work, the PM’s primordial function is to oversee the project and aid in its completion through proper guidance and coordination. Project Management is the management of construction projects that require the knowledge of modern management skills, tools and understanding the overall construction process.

The course covers Construction management from concept phase through move in, including budgeting and cost estimating, the tendering and delivery process, programming and space planning, selecting the design team, managing construction and occupancy. Techniques for cost analysis, scheduling and procedures contracting, construction, construction coordination, and the control of change orders are reviewed. The impact of scheduling on contractor claims is studied, along with management reporting and feedback. To further add to that, the course provides an overview of the management of building alteration and new construction projects. The course traces the life cycle of a typical project from inception to move-in, including planning, scheduling, budgeting, programming and space planning, design construction, material procurement and occupancy. Emphasis is on management of the process, rather than technical aspects. Viewpoint is that of the facility manager of project manager, responsible for on-time, within budget completion.

**Learning Methodology:**

Construction Projects have a specific set of goals and objectives. Accomplishing the project goal and /or fulfilling the project’s mission require a delicate balance time, quality and affordability. This class teaches the techniques to recognize, organize and demonstrate project management competency.

Study of basic concepts of Project Management from inception to execution and delivery of the project, preparation of CPM. PERT (Program Evaluation and Review Technique) to monitor progress quality and cost. Study of the risks and other unforeseen aspect including legal, social and financial study for various computers soft wares designed for project management such Primavera, project planner.

List of topics to be covered, in lectures, including the list of necessary resource books, is carefully formulated and listed below.

**Program Educational Objectives (PEO’s)**

**PEO 1:** Ability to understand the process of construction.

**PEO 2:** Critical learning for a broad function in various areas of Buildings construction issues including structural, mechanical, electrical, environmental, earthquake, and management.

**PEO 3:** Ability to keep themselves abreast with recent developments in construction management.

**PEO 4:** Spirit of discipline and respect for the code of ethics of the profession.

**Program Learning outcomes PLO’s)**

Graduates of the B-Architecture at UMT are expected to have acquired and developed the following set of knowledge, skills and personality traits (these are also referred to as graduate attributes).

**PLO 1** **Architectural Knowledge:** An ability to apply knowledge of mathematics, science, architectural fundamentals and an architectural specialization to the solution of complex architectural problems.

**PLO 2** **Design Analysis:** An ability to identify, formulate, search literature, and analyze complex architectural problems reaching substantiated conclusions using principles of natural sciences and architecture.

**PLO 3** **Design/Development of Solutions:** An ability to design solutions for complex architecture problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

**PLO 4** **Case study analysis:** An ability to investigate complex architecture problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.

**PLO 5** **Modern Tool Usage:** An ability to create, select and apply appropriate techniques, resources, and modern architectural computer simulations, including prediction and modeling, to complex activities, with an understanding of the limitations.

**PLO 6** **The Architect and Society:** An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional architectural practice and solution to complex problems.

**PLO 7** **Environment and Sustainability:** Ability to understand the impact of professional architectural solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

**PLO 8** **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of architectural practice.

**PLO 9** **Individual and Team Work:** An ability to work effectively, as an individual or in a team, on multifaceted and/or multidisciplinary settings.

**PLO 10** **Communication:** An ability to communicate effectively, orally and written, on complex architectural activities with the architectural community and with society at large, such as being able to comprehend and write effective reports, design documentation and make effective presentations. To develop an understanding of architectural language through manual and digital ways, in order to make working drawings and presentable sheets using different rendering modes.

**PLO 11** **Project Management:** An ability to demonstrate management skills and apply architectural principles to one's own work as a member and/or leader in a team and to manage projects in a multidisciplinary environment.

**PLO 12** **Lifelong Learning:** Ability to recognize the importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

**Course Learning Outcomes (CLO’s)**

1. Explain the students process of construction and stakeholders involved in it. (C1)
2. Summarize the construction activities, use of materials and tool/plants involved in construction...(C3)
3. Give awareness about construction contracts and terminologies used. (C2)
4. Explain issues and their remedies faced at site during the construction process. (C4).
5. To develop and enhance the graduate’s understanding on construction management of building projects. (C5)

**Mapping of CLO’s to Program’s Learning Outcomes(PLO’S)**

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| **Semester** | **Course Code** | **Title** | **Course Learning outcomes** | PLO 1: Architectural Knowledge | PLO 2: Design Analysis: | PLO3: Design/Development of Solutions Design/Development of Solutions Design/Development of Solutions Design/Development of Solutions | PLO 4: Case study analysis | PLO 5: Modern Tool Usage | PLO 6: The Architect and Society | PLO 7: Environment and Sustainability | PLO 8: Ethics | PLO 9: Individual and Team Work | PLO 10: Communication | PLO 11: Project Management | PLO 12: Lifelong Learning |
| **9th SEMESTER** | **AR-514** | **Construction Management and Project Scheduling** | Explain the students process of construction and stakeholders involved in it.(C1) | √ |  |  |  |  |  |  |  |  |  |  |  |
| Summarize the construction activities, use of materials and tool/plants involved in construction...(C3) |  |  |  |  | √ |  |  |  |  |  |  |  |
| Give awareness about construction contracts and terminologies used. (C2) |  |  |  |  | √ |  |  |  |  | √ |  |  |
| Explain issues and their remedies faced at site during the construction process. (C4). |  |  |  |  |  |  | √ |  |  |  |  |  |
| To develop and enhance the graduate’s understanding on construction management of building projects.(C5) |  |  |  |  |  |  |  |  |  |  |  | √ |

Criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Quizzes / Field Trip 15

Assignments 10

Mid Term 25

Final exam 50

Total: 100

**Recommended Text Books:**

* The Architects Handbook of Professional Practice, Fifth Edition, Wiley
* Human resource planning, John Braham.
* Supervision Concepts and Skill building, Samuel Certo.
* Project Planning, Scheduling & Control, James P Lewis PhD.
* Making things happen, Mastering Project Management, Scott Berken.
* Projects: planning, analysis, selection, financing implementation and review, Persanna Chandra.
* Effective Project Managements, by Clements/Gido.
* Finding the Critical Path, RL Mortino

**Reference Books:**

* The Project Resource Manual: CSI Manual of Practice, Firth Edition, (The Construction Specifications Institute).
* Construction Project Management, planning, scheduling and controlling by KK Chitkara
* International Building Code Illustrated.
* PEPRA Website.
* LEED (PAKGBC), website.
* CMAA Website.
* PEC Website.
* PCATP Webs

**Calendar of Course contents to be covered during semester**

Course code**: AR-514,** Course title**: Construction Management and Project scheduling**

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| **Week** | **Course Contents** | **CLO** | **Reference Chapter(s)** |
| 1 | Introduction to the Course outline, General Requirements, Attendance Procedure, and Overall Criteria. | C1 | Class lecture |
| 2 | What are Construction Project Management and Project Scheduling? Details of a complete construction projects will be explained; this includes:   1. Planning (Budgeting, Designing and Bidding/Negotiation (PEC) 2. Onsite Construction 3. Occupancy/Move 4. Project Close Out   Key elements for project completion such as Time (Schedule), Cost (Budget), Quality (Performance), and Move-in and Post occupancy evaluation will be discussed. | C1 | Module 1:  CSI Manual.  PEC document |
| 3 | **The Project Management team:**   1. Owners. 2. Developers. 3. Designers (Architects, Interior designers and town planners). 4. Builders. 5. Construction managers/ Project Managers. 6. Suppliers and Subcontractors. 7. Lenders and Investors. (Financial Institution). 8. Insurers and sureties | C2 | Module 1 & 2:  CSI Manual. |
| 4 | **Site Management Program:**   1. Assignment of responsibility. 2. Hazard identification and control. 3. Training and communication. 4. Documentation and enforcement of safety rules. 5. Establishing safety performance objectives for all levels of management. 6. Safety as part of management, performance reviews.   Measuring effectiveness of HSE, and site safety program. | C4 | **Reaction Paper 1**  (Construction Site Documentation)  ENR: Website review.  Details will be given in class. |
| 5 | Key terms in the Construction Project Management industry used throughout the world, briefed and discussed with the students. | C2 | LEED Website:  Document |
| 6 | Key terms continued discussion of PPRA (Punjab govt. under section 26 of the Punjab Procurement Regulatory Authority Act 2009) rules along with Selection criteria of Contractor, Tender documentation and Construction Documents, specifications prepared by the Architect. | **C5** | **Reaction Paper 2**  Research Tender documents from Newspapers, review apply key terms and PPRA website.  Details will be given in class. |
| 7 | **Construction Cost Analysis:** review of cost estimate, significance, strategies with market analysis. | C5 |  |
| 8 | **Mid-Term Exam** |  |  |
| 9 | **Planning Construction Manpower**:  Corporate Human resource (HR) management covers a wide spectrum of functions. These include forecasting needs, formulation of pays scales and service conditions, recruitment and induction, training and development, morale and motivation, health and welfare. Safety and security, and maintenance of harmonious industrial relations.  The lecture will cover the scope of construction manpower planning, and things related to it such as:  1) Establishing workers’ productivity standards.  2) Scheduling Construction Site workers.  3) Grouping Project Manpower.  4) Designing worker’s financial incentive schemes.  The project construction manpower planning is primarily concerned with estimating the worker's productivity, scheduling manpower employment, and structuring it onto worker’s teams and work groups with a view to economically match manpower supply with the task requirements.  Also the difference between direct and indirect workers and how they are scheduled in a construction project. | C3 | Chapter: 7  CPM Book by KK Chitkara. |

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| 10 | **Project Construction Equipment**:  The construction equipment plays a significant role in the execution of the modern high cost time bound construction projects.  An indispensable item of resources, it produces output at accelerated speed, and enables completion of tasks in a limited time. Equipment saves manpower, which is becoming scarce, costly and more demanding day-by-day.  Equipment improves productivity, quality and safety.  The lecture will outline the commonly used construction equipment. It introduces the suitability of equipment of executing various tasks; it describes the approach generally followed for assessing the ideal output of the equipment.  The main areas to be covered in the lecture will be:  1) Classification of major equipment.  2) Earth Factor in Earth work.  3) Earth Excavating equipment.  4) Earth Cutting and hauling equipment.  5) Earth Compacting and grading equipment.  6) Concrete plant and equipment.  7) Cranes for material handling. | C3 | Chapter: 9 & 10.1  CPM Book by KK Chitkara. |
| 11 | **BOQ Assignment,** Presentation in groups.  Survey of building materials and their rates in market |  |  |
| 12 | **Project Activities**: Explained the nature of activities in a construction project. An activity is an identifiable, quantifiable, measurable and cost-able, discrete, lowest level element of the work.  Explained the role of work break down structure and its various kinds and applications in different projects. The project can be an individual project or a group of projects such a Housing Scheme, School or just a house. | C5 | Chapter: 3  CPM Book by KK Chitkara. |
| 13 | **Project Scheduling and Critical Path**: Briefed the class about Project scheduling with respect to computer applications such as MS Project and Primavera. The construction projects are best organized by tasks, best controlled by the work packages, and best programmed for day work by using operational level best planned and monitored by the activities. In a Project master plan, each work package is assigned its performance objectives. These are generally state in terms of its completion period, standard cost, resources productivity standards and the standards sale price. The measure of performance thus, gets closely linked with the execution of its work packages. | C5 | Chapter: 4  CPM Book by KK Chitkara. |
| 14 | Site Visit to a commercial building to review, **Critical Path** of a project in process. | C5 | **Site Visit** |
| 15 | Review of Course material for the exam |  | Lecture by Guest speaker. |
| 16 | **Final Exam** |  |  |