



B.S. Abdur Rahman  
**Crescent**  
Institute of Science & Technology  
Deemed to be University u/s 3 of the UGC Act, 1956  
GST Road, Vandalur, Chennai 600 048

M.ARCH (GENERAL)

SYLLABUS & REGULATIONS- 2018

UNIVERSITY VISION AND MISSION

### VISION

B.S. Abdur Rahman Crescent Institute of Science & Technology aspires to be a leader in Education, Training and Research in Engineering, Science, Technology and Management and to play a vital role in the Socio-Economic progress of the Country.

### MISSION

- To blossom into an internationally renowned University
- To empower the youth through quality education and to provide professional leadership
- To achieve excellence in all its endeavors to face global challenges
- To provide excellent teaching and research ambience
- To network with global Institutions of Excellence, Business, Industry and Research Organizations
- To contribute to the knowledge base through scientific enquiry, Applied Research and Innovation.

VISION AND MISSION OF  
CRESCENT SCHOOL OF ARCHITECTURE

VISION

Crescent School of Architecture aims to emphasis on Curiosity, Innovation and Discovery in the field of Architecture that will connect with the profession and strives for Global standards through collaborative innovation and passion for enquiry.

MISSION

- To create opportunities for innovative academic experience which brings together academics and professional practice.
- To provide academic climate for students to understand, enquire, reflect, grow and contribute to succeed in a rapidly changing society.
- To pursue excellence in learning through contemporary foundation of liberal learning that celebrates diversity and complexity that instills empowerment on social responsibility.
- To achieve excellence in all its endeavors to face global challenges.

**PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):**

Master of Architecture curriculum is designed to prepare the graduates having aptitude and knowledge,

1. To provide the graduates with additional knowledge and skillset in the field of architecture.
2. To provide high quality education to assume professional roles in architecture by offering sound knowledge in theories and applications in the field of Architecture.
3. To enable students to widen the scope of their professional abilities through additional fields of architecture that would enhance their knowledge in intellectual, creative, technical, social and environmental realms.
4. To put into practice and inspire high ethical values and technical standards.
5. To evolve a professional capable of vision, innovation and competence keeping in view the human value system.

**PROGRAMME OUTCOME (PO):**

On successful completion of the Programme, graduates would have,

- a) Ability to apply creativity, innovations, develop competence in design development towards appropriate technology.
- b) Ability to conceptualize and coordinate designs, addressing social, cultural, environmental and technological aspects of architecture.
- c) Ability to analyze and apply theoretical knowledge to achieve more successful and ideal design solutions.
- d) Ability to understand ethical and professional responsibilities.
- e) Ability to apply and integrate computer technology in design process and products.
- f) Ability to bring in technical expertise in analysis and synthesis.
- g) Ability to apply visual and verbal communication skills at various stages of architectural design and project delivery process.
- h) Ability to work collaboratively with teams of architects and various interdisciplinary teams.
- i) A commitment to quality with ethical values, timelessness in architecture with continuous improvement.

**NEED FOR THE PROGRAM:**

To respond to the increasing competition in the professional procurement of building and the growing demand for specialist knowledge & skills in the pursuit of architectural excellence, this programme focuses on development & application of specialist architectural knowledge & advanced design techniques & technologies.

**PROGRAM OUTLINE:**

- The master of architecture is a rigorous and comprehensive program, preparing graduates for the full range of professional activities in the field of architecture.
- The Masters programme aims to provide solid base of knowledge in history, theory, technology, the social environment, and professional practice.
- Studios are the focus of the program and are supported by non studio courses committed to developing independent thinking and resolving design issues

**COURSE OUTLINE:**

- In this curriculum, we have three coordinated design studios, one in each semester.
- Each coordinated semester has a different set of objectives and combination of non studio classes.

**AIM:**

Through integration of different modules and series of progressive sessions, the programme aims to produce architects who are competent to design a building by accomplishing further advances in the work of contemporary practice.

**OBJECTIVES:**

- Appreciating and recognizing the interdependence between the people & built environment with broad and diverse implications at every scale.
- Understanding design concepts & the real world applications from multiple perspectives.
- Enables the students to study and understand the tools and technologies associated with contemporary design practices.

## SEMESTER I

ARC M 1101 **ADVANCED BUILDING SERVICES**

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Course Outcomes:

After successful completion of this course, student should be equipped:

- To develop awareness and understanding of Advanced Building Services employed in various complex buildings and address environmental issues related to these services.
- This course aims to understand the integration of services in the sustainable design solutions.

UNIT 01: WATER SUPPLY & PLUMBING SYSTEMS IN HIGH RISE BUILDINGS:

Water supply & Plumbing systems in high rise building complexes and complex structures: Procurement, demand and distribution of water in large complexes. Quality of water consideration for different uses. Systems and equipment used in Treatment of water for distribution, recycling and reuse and specialized equipment used for this purpose. Identify special needs for a building typology-development. Case studies of such structures and reporting.

UNIT 02: SANITATION AND WASTE DISPOSAL SYSTEMS IN HIGH RISE BUILDINGS:

Sanitation and Waste disposal systems in high rise building complexes and complex structures: Collection and disposal systems used in high rise buildings and complex structures. Effluent treatment plants and their efficiency, chemical properties of the treated effluent considering the source and end use.

Concept of recycling and reuse of treated effluent. Rain water harvesting and similar methods of conserving water resources used in High rise Buildings. Disposal of treated effluent into natural sources of water. Storm/rain/surface water estimation, collection systems and disposal.

UNIT 03: MECHANICAL & COMMUNICATION SYSTEMS

Mechanical & Communication systems (elevators, escalators, conveyors, etc.). Security systems etc. in high rise building complexes, public buildings, Parking lots and complex structures like Hospitals, public transport terminals etc. Design parameters for determining the loads & requirement, Operation and maintenance of these Services. Case studies of such structures and reporting.

UNIT 04: ELECTRICAL AND TELECOMMUNICATION SYSTEMS

Electrical and telecommunication systems in high rise building complexes public buildings, and complex structures like Hospitals, public transport terminals, IT complexes etc. Design parameters for determining the loads & requirement, Operation and maintenance of these Services. Case studies of such structures and reporting.

UNIT 05: LIGHTING, HEATING, VENTILATION & AIR CONDITIONING SYSTEMS

Lighting, Heating, Ventilation & Air conditioning systems in high rise building complexes, public buildings, Parking lots and complex structures like Hospitals, public transport terminals etc. Design parameters for determining the loads & requirement, Operation and maintenance of these Services. Passive & active ways of control of heat, light, humidity etc. for comfort conditions. Introduction to simulation software to determine comfort conditions in various spaces. Case studies of such structures.

UNIT 06: FIRE SAFETY IN BUILDINGS:

Various techniques that has to be installed during and after the construction of buildings in various typology of buildings- focus on high rise buildings. Wet risers, Sumps, Smoke detectors, Alarms, Sprinkler systems, Fire escape stairs, Fire resistant doors, Fire resistant rating of materials and Fire fighting equipment etc. Contemporary practices in fire safety, norms and terms to be followed by the architects during the course of detailing, etc.,

## Required Readings:

- Environment and services – Peter Bucberry
- ABC's of Air Conditioning – Ernest Tricomi
- Heating and Air Conditioning of Buildings
- Environmental Science – Smith Philips and Sweeney
- Mechanical & Electrical Equipment in Buildings
- Sanitation, Drainage, & Water Supply – Mitchell
- Drainage & Sanitation – E. H. Blake
- Heating & Hot Water Supply – Hall.
- Architectural Acoustics By M. David Egan
- Architectural Acoustics By Marshall Long

AR M 1102 RESEARCH METHODOLOGIES

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This subject is intended to equip the students with some knowledge in areas which are not covered otherwise in the curriculum.

**EMPHASIS:**

- To introduce the students to the importance of critical inquiry as a way of gaining knowledge and adding to it through research.
- To expose the students to the various forms of research and research methodologies/processes.
- To engage this understanding in the specific field of architectural research.

**UNIT I INTRODUCTION**

Basic research issues and concepts- orientation to research process- types of research: historical, qualitative, co-relational, experimental, simulation and modeling, logical argumentation, case study and mixed methods- illustration using research samples.

**UNIT II RESEARCH PROCESS**

Elements of Research process: finding a topic- writing an introduction- stating a purpose of study identifying key research questions and hypotheses- reviewing literature- using theory- defining, delimiting and stating the significance of the study, advanced methods and procedures for data collection and analysis- illustration using research samples.

**UNIT III RESEARCHING AND DATA COLLECTION**

Library and archives- Internet: New information and the role of internet; finding and evaluating sources- misuse- test for reliability- ethics. Methods of data collection- From primary sources: observation and recording, interviews structured and unstructured, questionnaire, open ended and close ended questions and the advantages, sampling- Problems encountered in collecting data from secondary sources.

**UNIT IV REPORT WRITING**

Research writing in general- Components: referencing- writing the bibliography – developing the outline - presentation; etc.

**UNIT V CASE STUDIES**

Case studies illustrating how good research can be used from project inception to completion- review of research publications.

**OUTCOMES**

- The student will develop the skill to identify, decipher and interpret issues relating to Architecture based on research enquiry methods.
- The student will gain knowledge of different methods of conducting research and research writing.

**REFERENCES**

1. Linda Groat and David Wang; Architectural Research Methods – 2<sup>nd</sup> edition ‘,John Wiley & Sons Inc,Hoboken,New Jersey, US , 2013.
2. Wayne C Booth; Joseph M Williams; Gregory G. Colomb; ‘The Craft of Research’ , 3<sup>rd</sup> Edition; Chicago guides to writing, editing and publishing;2008
3. Iain Borden and Kaaterina Ruedi Ray ; The Dissertation: An Architecture Student’s Handbook; Architectural Press; 2006



4. Ranjith Kumar; Research Methodology- A step by step guide for beginners-3<sup>rd</sup> Edition ; Sage Publications;2011
5. John W Creswell; Research design: Qualitative, Quantitative and Mixed Methods Approaches; Sage Publications; 2011.
6. JA Smith, P Flowers, M Larkin -Interpretative Phenomenological Analysis: Theory, Method and Research (English) FIR Edition- Sage Publication -2009.

AR M 1103

DIGITAL TOOLS FOR ARCHITECTURAL REPRESENTATION

/ DIGITAL TOOLS FOR CONTEMPORARY PRACTICES

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Each of the below mentioned topics shall be introduced in lecture periods and is to be dealt with subsequently in the studios in detail. This course will focus most intensely on the general skills involved in exploring 3d spaces and constructed assemblages - representational (analog and digital), developing a fluency for visual thinking (through intensive practice), and then effectively communicating analytics or creativity through architectural conventions.

Course Objectives: Integrating Digital Operational Strategies Into A Design Method

### CONTENT:

The focus of teaching in this subject shall be as following,

- Animation soft wares & Advanced rendering & modeling soft wares
- Visualization: Introduction to Visualization tools in Architecture such as 3D software, Nurbs modeling, parametric modeling, BIM.
- Rendering: Introduction to rendering techniques including Material mapping, Lighting, Perspective.
- Presentation: Introduction to presentation tools & techniques for print and digital medium.

### References:

- Architectural Drawing, Rendow Yee,
- "The Necessity for Drawing", Michael Graves
- "Translations from Drawing to Building", Robin Evans
- Terzidis Kostas ,Algorithmic Architecture, Architectural Press , Oxford , 2006
- Helmut Pottmann, Michael Hofer and Axel Kilian (eds),
- Advances in Architectural Geometry, Vienna, 2008
- Helmut Pottmann, Michael Hofer and Axel Kilian (eds), Advances in Architectural Geometry, Vienna, 2008
- Cecil Balmond, Geometry, Algorithm, Pattern: The Serpentine Pavillion 2002,
- Digital Tectonics, ed Neil Leach, London ,Wiley-Academy, 2004. 132 Print. Alexander, C. (1964).
- Goodness of fit. In Notes on the Synthesis (pp. 15-28). Cambridge: Harvard University Press.

### Intent

Design Studio I will lay emphasis on the design projects with emphasis on minimal blocks with focus on detailing and research orientation. This challenges the students to think critically in their design of space and to develop solutions that not only enhance quality of life, but also protect the health, safety, and welfare of users as prescribed in the various codes and regulations.

It is also the culmination and application of knowledge gained about the principles and fundamentals studied throughout the first semester theory and theory cum studio courses.

### Content

The Design exercise should reflect the inputs from other subjects. The design process may involve literature studies, case studies, site visits, data collections and analysis eventually resulting design solutions that are derived out of research and its synthesis.

### Studio Brief

Different functional types viz hospitality, institutional (relating to education & health) and commercial (shopping malls), recreational, (theatres, clubs etc) and public use complexes (airports, bus terminals, railways stations) will form the major design assignments.

The design exercise should address issues such as institution character through interior environment, corporate image, economic factors & behavioural patterns; integration of commercial activity etc. Design portfolio should include furniture layout, electrical layout, false ceiling plan, partition designs & details, flooring plan, design of doors & windows, colour schemes etc, specifying materials usage and the related technical knowledge.

The design exercise should address issues like design language, visual coordination, culture, traditions and behavior patterns in the use of space.

### References

- Rethinking Design and Interiors: Human Beings in the Built Environment, By Sashi Caan.
- Interior Design -John Pile; Harr N.Abraham, Inc. Publishers.
- Interior design Illustrated; Francis.D.K.Ching.
- Time Saver standards for Interior Design & Space Planning – Joseph de Chiara, Julius Panero, and Martin Zelnic – 2003.
- The Interior Design Reference & Specification Book : Linda O Shea,Chris Grimley,Mimi Love.
- Lighting for Interior Design – Malcolm Innes

SEMESTER II

AR M 1201 ADVANCED BUILDING MATERIALS AND TECHNOLOGY

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Outcome:

At the completion of the course the students will be able to:

- To develop awareness and understanding construction of large span structures, high rise buildings, Pre-fabrication in building construction, Modular co-ordination, and advance building materials.

## COURSE CONTENTS:

## UNIT 1: LARGE SPAN STRUCTURES:

Conceptual Understanding of various large span structures, like Geodesic domes, hyperbolic paraboloids, and free form shapes etc. used for Airports, Stadium, Industrial buildings, public spaces etc. Construction details, Service systems, Structural Systems, Sequence of erection and facilitating maintenance of such structures. Identify specialized equipment required for erection of such structures. Case studies of such structures and reporting.

## UNIT 2: ADVANCED BUILDING MATERIALS:

Study of advanced building materials like Special alloys of steel & other metals, glass, polymer, fabric, Various types of finishes & treatments, Construction chemicals, specially manufactured items etc. and specialized equipment required for Installation and construction. Market survey and collection of information about the materials.

## UNIT 3: UNDERSTANDING OF HIGH RISE BUILDINGS:

Conceptual Understanding of High rise buildings in normal and adverse conditions considering topography of the site, water-logging, marine structures, etc., Construction details understanding, Service systems, Structural Systems, Sequence of erection and facilitating maintenance of such structures. Identify specialized equipment required for Installation of such structures. Case studies of such structures and reporting.

## UNIT 4: PRE-FABRICATION IN BUILDING CONSTRUCTION:

Conceptual Understanding of Pre-fabrication in building construction. Concept of Modular co-ordination. Construction details understanding, Service systems, Structural Systems, Sequence of erection and facilitating maintenance of such structures. Essential process of manufacturing, handling of pre-fabricated components. Identify specialized equipment required for erection of such structures. Case studies of such structures and reporting.

## UNIT 5: BIO –MATERIALS:

Properties, Application, Specification and Standards ( Indian and International) Bio materials from Industrial Waste, Mining Waste, Mineral waste, Agricultural Waste. Working Details and Case Studies.

**UNIT 06: NEW EMERGING MATERIALS:**

Properties, Application specification and Standards (Indian and International) Teflon, Special Glasses, Aluminum composite Panel, cables and plastics , Polymers, Aerogels, etc., Nano Technology Applications in construction. Working Details and Case Studies.

**References:**

- Architects working details Vol. 1 to 16
- Time – saver Standards
- Structure in Architecture, by Salvadori and Heller
- Design of Steel – Structures by Vazirani – Rathvani
- Elements of structure by Morgan
- Steel space frames by Makovsky
- Sylvia Leydecker, Nano Materials: In Architecture, Interior Architecture and Design.
- William P.Spence, Construction Materials, Methods and Techniques

AR M 1202

PERFORMANCE &amp; ENERGY EVALUATION

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Overview:

As energy is becoming more precious, it is crucial for building sector to proactively design and operate high performance buildings. To achieve higher standards in building design and operation, a solid foundation of energy engineering and sustainability principles is essential.

This course builds essential knowledge of building energy and sustainability, and provides necessary background to use building energy simulation software tools. The goal of this course is to use building performance modeling as an investigative tool to improve overall energy efficiency of the building.

Course Objectives

- To recognize various building energy simulation tools, types and capabilities.
- To learn underlying concepts, modeling inputs and analysis methods of building components
- To model building performance using energy simulation software.
- To interpret simulation results and troubleshoot errors.
- To use measured building energy data to calibrate simulation model

Course Contents:

- Energy Crisis, Codes & Milestones , Global trends, “Peak Oil 2020,” building energy use & challenges
- History & definitions of energy standards, codes and protocols
- Energy policies EPCA & EAct Need for Building Energy Evaluation
- Importance of energy evaluation
- Terminology & metrics
- Approach to new & existing buildings Weather & Climate Characteristics
- Terminology
- Earth: orbit, rotation, sun’s radiation
- Climate zone characteristics Building Energy Analysis (BEA)
- Introduction to Building Energy Analysis
- BEA as a tool for decision-making
- BEA as a process-oriented approach and tools

AR M 1204 ARCHITECTURAL DESIGN STUDIO II

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### Intent

Design Studio II will lay emphasis on the design projects where they learn to explore, investigate and apply various parameters of sustainability for design development of projected building/urban scenarios.

It is also the culmination and application of knowledge gained about the principles and fundamentals studied throughout the second semester theory and theory cum studio courses.

### Content

Design Projects where students design large scale projects in the outset of an township/ gated community, small plaza and similar urban situations where in-depth Site Analysis and Site Planning knowledge is required.

### Studio Brief

The design studio will focus on the role of emerging tools and processes for understanding and of complex and macro forces in the realm of the built environment as well as designing within this context. It would explore relationships between user group activity, movement, landform and urban form using diagramming and mapping tools to come up with creative prescriptions of certain projected scenarios. The studio will also emphasize on collaborative learning processes. The projects would be of macro scale involving large campus/ township oriented architectural projects as well as urban design.

### References

Jack E. Ingels, Landscaping – Principles & Practices , Pelmer Publishers Inc., 1992

Grant W Reid, Landscape Graphics, Watson – Guptill publication, New York, 1987.

David Sauter, Landscape Construction, Pelmer Thomson Learning, 2000.

Michael Little wood, Landscape Detailing Volume I -IV, Architectural Press, 1993

ELECTIVE

AR M 1211 LAWS, ACTS &amp; GOVERNANCE

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## COURSE OUTCOMES:

After successful completion of this course, student should be able to: Develop an awareness Significance and Architect's role in profession. Acquaint with relevant Acts & Laws and general Management of Architectural Practice.

## COURSE CONTENT:

## UNIT 01-

An overview of the Town Planning Acts of Urban Development ministry of States & Central Government. The rules and regulations for Development Control and the principles behind the framing of these. Regional Plan, Development Plans, at State, District, Urban agglomeration, Municipal Corporations & Councils, Improvement trusts & Regional Development Authorities, CRZs, etc. Procedures for formulations, Implementation and applying for approvals at various levels.

## UNIT 02:

Architects office and office Management. Interaction with the consultants. Design Management Issues. Role & Duties of Architect as an Employer or Employee. International Architectural practice and role of Various Statutory / Regulatory bodies in licensing like RIBA, AIA, etc

## Unit 03:

Regulations, Conditions and requirements of qualification, equivalence etc. for International practice in countries other than India like: USA, UK, Europe, Gulf countries, Asian countries

## Unit 04:

An overview of various Acts relevant to the Architectural profession: Taxation laws like IT, Service Tax, etc.

## Unit 05:

An overview of various Acts relevant to the Architectural profession: like Indian Contract Act, Environment related laws, etc

## References:

1. Various acts pertaining to the syllabus
2. COA Handbook of Professional Documents 2009
3. Professional Practice By Roshan Namavati 2005 Lakhani Book Depot
4. Professional Practice By Madhav Deobhakta



AR M 1212 PROJECT MANAGEMENT

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**COURSE OUTCOMES:**

The students should be able to:

- Apply the basics of project and quality management for any given construction project under the given legal framework.

**COURSE CONTENT:****UNIT I PROJECT MANAGEMENT**

Characteristics of a project, Need for project management, Project cycle (conception, planning and execution), Factors contributing to success of project, Role and responsibilities of a project manager.

**UNIT II PROJECT TEAM**

The actors involved in a project (across scale and typologies), project team, role of individual actors and their impact on the management cycle.

**UNIT III TIME AND COST MANAGEMENT**

Financing of projects (how various projects are financed), capital budgeting, financial risk analysis, financial control of projects, tendering and estimating, activity sequencing, duration and time planning, scheduling and control, labour costing and subcontracting.

**UNIT IV QUALITY MANAGEMENT**

Factors affecting the quality of a project, Authorities involved in quality assurance and control, material management, Equipment management, Human resource management, Safety-Factors affecting safety and safety standards.

**UNIT V PROJECT MANAGEMENT LAW**

Regulations and laws governing project management, law of contract, the duties and liabilities of different parties in a project, negligence, claims, procurement ,risk allocation and remedies

**References:**

1. Fredric Plotnick, "CPM in Construction Management", McGraw-Hill Education, 2009
2. Chris Hendrickson and Tung Au, Project Management for Construction - Fundamental Concepts for Owners, Engineers, Architects and Builders, Prentice Hall Pittsburgh, 2000
3. Robert L. Peurifoy and Clifford J. Schexnayder , "Construction Planning, Equipment, and Methods" McGraw-Hill Education, 2010 John L. Ashford, The Management of Quality in Construction. E & F.N, Spon. New York, 1989
4. Jimmie Hinze, Construction Contracts-3 rd Edition, McGraw Hill, 2010
5. Joseph T. Bockrath, Contracts, the Legal Environment for Engineers and Architects, McGraw Hiii, 2000
6. BIS rules and regulations.

AR M 1214 GIS MODELLING

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**COURSE OUTCOMES:**

The students should be able to:

- Develop System concepts & Coordinate systems with standard GIS package
- Develop maps and reports in Urban and Regional Planning, using GIS models
- Solve Planning Problems with GIS Spatial data"s
- Conduct urban settlement analysis & impact studies with GIS models

**COURSE CONTENT:****UNIT I INTRODUCTION**

Definition, map and map analysis, automated cartography, history and development of GIS, Hardware requirement, system concepts, co-ordinate systems, standard GIS Packages.

**UNIT II DATA ENTRY, STORAGE AND MAINTENANCE – IN URBAN AND REGIONAL PLANNING**

Types of data, spatial and non-spatial data, data structure, points, lines, polygon, vector and raster, files and file organization, database, data entry, digitizer, scanner, Dbase, files and data formats, data compression. Classification of spatial and non-spatial date – application of spatial date in urban and regional planning – objectives and functions of GIS models in urban and regional planning.

**UNIT III SPATIAL DATA INPUT**

Defining the objectives of a GIS planning problems – Identification of required spatial data layers – coding schemes – digitisation of spatial date – editing spatial date usable for the given planning problem.

**UNIT IV ATTRIBUTE DATE INPUT**

Role of attribute data in defining geographic features – adding attribute data file – topology generation – joining attribute data to its geographic features.

**UNIT V SPATIAL ANALYSIS USING GIS**

Performing overlay functions – manipulating attribute data – GIS modeling – map and report generation – case problems on regional analysis, impact assessment study, project formulation and land suitability analysis.

**REFERENCES**

1. Julia Jaklitsch, "Integration of 3D GIS into urban service processes: Research and Implementation", 2014
2. Ian Heywood and Sarah Cornelius, " An Introduction to Geographical Information Systems", Pearson, 2012

3. Klosterman RE. "Micro Computer packages for planning analysis", American Planning Association Journal, Autrenn, 1990
4. ERSI (1992) Understanding GIS, "The ARCI INFO methods", ERSI, USA
5. Niklaus Kämpfer , "Monitoring Atmospheric Water Vapour: Ground-Based Remote Sensing and In-situ Methods (ISSI Scientific Report Series)", springer, 2013
6. C. Dana Tomlin, "GIS and Cartographic Modeling", Esri Press, 2012