# **UNIVERSITY OF MUMBAI**



Syllabus for the Bachelor of Architecture

Programme: B.Arch.

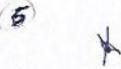
Bachelor of Architecture (Semester III & IV)

(As per Credit Based Semester and Grading System with effect from the academic year 2013–2014)

# Scheme of Teaching and Examinations Bachelor of Architecture (B. Arch.) Semester III

	Semester III Exam conducted by individual colleges	Teaching	Credits			
Sub No.	SUBJECTS	Lecture	Studio	Theo ry	Studio	Total
301	Architectural Design Studio	1	6		6	6
302	Allied Design Studio		3	The same	3	3
303	Architectural Building Construction	3	3 classes Technology	3	1	4
304	Theory and Design of Structures	2		2	1	3
308	Architectural Building Services	2	studio	2	1	3
305	Humanities	3		3		3
306	Environmental Studies	2		2		2
307	Architectural Representation & Detailing	2	2	2.	2	4
309	Architectural Theory	2			FOR STATE	2
320	College projects		3			3
321	Elective		3	III.		3
	Total	16	20	16	20	36

	Semester I II Exam Exam conducted by individual colleges	Examination Scheme						
Sub. No.	SUBJECTS	Theory (paper)	Internal	External viva	Total			
301	Architectural Design Studio		100	100	200			
302	Allied Design Studio		100		100			
303	Architectural Building Construction	50	50		100			
304	Theory and Design of Structures	50	50		100			
308	Architectural Building Services	50	50		100			
305	Humanities	50	50		100			
306	Environmental Studies	Olico III	50		50			
307	Architectural Representation & Detailing		100		100			
309	Architectural Theory		50		50			
320	College projects	400	100	THE PARTY NAMED IN	100			
320	Elective		100		100			
	Total				1100			



# Syllabus (Course Content) for Second Year B. Arch. Semester III

# 301 Architectural Design Studio 3

### Credits-6

# Teaching Hours

Lectures-

Studio- 108 periods of 50 minutes duration -90 hours

### Sessional marks-

Internal- 100

External --- 100

# Objectives:

Understanding space requirements for various activities for small groups of people Understanding indoor and out door spaces created by built forms.

# Design Objectives

Design of spaces suitable for the intended activity

Design of spaces as per the behavioral needs of individuals and groups.

Design and detailing of built form and required infrastructure with reference to methods of construction, and materials

### Design projects

Built and Un-built spaces for multiple activities for a small group of people Built and Un built spaces for relatively larger groups.

# 302 Allied Design Studio 3

### Credits-3

### Teaching Hours

Lectures

Studio- 54 periods of 50 minutes duration - 45 hours

### Sessional marks-

Internal- 100

External -----

The course content will be developed by the individual colleges as per their choice of Allied Design scheme.

# 303 Architectural Building Construction & Materials 3

#### Credits-4

# Teaching Hours-

Lectures-54 periods of 50 minutes duration- 45 hours

Studio- 54 periods of 50 minutes duration- 45 hours to be conducted as technology studio (out of which 15 hours are considered for credit calculations)

#### Scheme of examination

Theory: one paper of three hours duration Max. marks- 50 Min marks for passing- 20

### Sessional marks-

Internal- 50 marks

External ----

# Objectives-

Understanding concepts of framed structures in R.C.C.

Understanding methods of construction of various components
of R.C.C. Structures

- Structural framing in R.C.C for low rise buildings.
- 2 Foundation Systems, Floor Systems, Wall Systems, staircases, Roof Systems,
- 3. Moisture and Thermal protection in R.C.C. framed low rise buildings.
- 4. Movable light weight partitioning and paneling, Stairs in Interior spaces.

Sessional Work: based upon above in form of sketches, drawings, Case Studies, Reports.

Application to Architectural Design Projects.

# 304 Theory & Design of Structures 3

Credits- 3

### Teaching Hours

Lectures- 36 periods of 50 minutes duration- 30 hours

Studio- 54 periods of 50 minutes duration- 45 hours

( to be conducted as technology studio out of which 15hours are considered for credit calculations)

### Scheme of examination

Theory -one paper of two hours duration Max, marks- 50 Min marks for passing- 20

### Sessional marks-

Internal-50

External ----

# Objectives:

Understanding of basic theories and principles of structural analysis
Understanding of properties of materials relevant to structural analysis
Understanding of behavior of structural elements under various conditions

# 1. Theory of simple bending

- a. Theory of simple bending only equations & problem.
- b. Design of timber & steel beams.
- c. Shear stress distribution.

# 2. Deflection

- Simply supported beams and cantilevers with distributed & point loads by Euler's theory.
- Introduction to Macaulay's method
- Application of deflection in structural planning

# Direct AND Bending Stresses

- a. Combined stress distribution for Beam, column and footing
- b. Application to design the footing of wall and column (only plan dimension)

### 4. Basics of RCC

Grades of concrete and steel used in RCC.

Application of thumb rules for selecting dimensions of slab, beam and column for low rise and low span structures. Placement of steel based of Bending moment and shear force diagrams

# Material testing

### Cement(OPC)

Initial and final setting time

Consistency

Fineness

Compressive strength

# Sand

Bulking, silt content, Fineness modulus

### Bricks

Density, Water absorption, compressive strength

# 305 Humanities 3

Credits-3

# Teaching Hours

Lcctures- 54 periods of 50 minutes duration - 45 hours

Studio- ----

### Scheme of examination

Theory -one paper of two hours duration Max, marks- 50 Min marks for passing- 20

### Sessional marks-

Internal-50

External ----

# The study of the socio-cultural circumstances, the art and the architecture of the following:

The decline of the Roman Empire

The beginnings of Christianity and the formation of the Holy Roman Empire

Early Christian architecture - Christian archi

Medieval Europe

The Gothic age

The rise of Islam and its impact on Europe

The Crusades and their aftermath; the fall of Constantinople

The Renaissance in Italy - USE

The rediscovery of the Classical past and its impact on art, architecture, science and philosophy

Humanism

The Masters of the Renaissance

Mannerism

The Renaissance in the rest of Europe

The Reformation, its impact on art and architecture

The Counter-Reformation

Baroque art and architecture — List

The age of discovery

Colonization and the changed world order

The Enlightenment

The age of revolution: America and France

The Industrial Revolution - Lis t

Its rise in England

Demographic change and urbanization

New materials and technologies and their impact - Wis

New building types for the industrial age - hist
The battle of 'styles'; nostalgia and exoticism
Neo-Classical and Neo-Gothic architecture - his

The Arts and Crafts Movements in Europe

Art Nouveau

Art Deco

Early modernistic impulses

Modern movements in art

Modern movements in architecture - kis t

# 306Environmental Studies

Credits-2

### Teaching Hours

Lectures- 36 periods of 50 minutes duration-30 hours

### Sessional marks-

Internal-50

External ----

Objective: To study and understand passive methods of environmental control

# Climatology and Building Sciences

Micro climate and Macro climate Energy flow in building Human comfort Traditional methods for achieving comfort

### Passive Methods of control

Natural lighting Solar Radiations and Architecture Air flow patterns inside buildings and in building layouts Natural ventilation

### 307 Architectural Representation & Detailing 3 Credits-4

### Teaching Hours

Lectures- 36 periods of 50 minutes duration-30 hours Studio- 36 periods of 50 minutes duration - 30hours

### Sessional marks-

Internal-100

External ----

### Perspective-

Perspective of building elements Perspective of interior spaces Sciography-

Shades and shadows of buildings and parts of buildings

Sessional work - Perspective and Sciography exercises

# Documentation and measured drawings

Methods of measurement of interior and exterior spaces, Building Elements.

Sessional work -

Architectural plans, sections, elevation of existing building/ interior space as per the measurements.

# 308 Architectural Building Services 1

### Credits- 3

# Teaching Hours

Lectures- 36 periods of 50 minutes duration- 30 hours

Studio- 54 periods of 50 minutes duration- 45 hours to be conducted as technology studio (out of which 15 hours are considered for credit calculation)

### Scheme of examination

Theory -one paper of two hours duration Max, marks- 50 Min marks for passing- 20

### Sessional marks-

Internal- 50

External ----

Objectives: understanding basic services required for a building and interior spaces

### Sanitation:

Sanitary appliances and user space requirement Various types of traps used with appliances Design of toilets Drainage and water supply connections to various appliances Systems of building drainage

# Water supply

Direct and indirect water supply for buildings Connection from Municipal water main- Ferrule, water meter. Design of water storage tanks, and down take pipes Taps and valves used with various appliances

### Sessional work

Market survey for appliances and accessories, Water supply calculations Water supply layout- connection from municipal main to buildings Water supply connections within the building Design of toilets with water supply and drainage connections





# 309 Architectural Theory 1

Credits- 2

Teaching Hours

Lectures- 36 periods of 50 minutes duration - 30 hours

Studio- ----

Sessional marks-

Internal-

50 marks

External ----

# READING

# Objectives:

- 1. To understand and comprehend ideas in architecture through writings in architecture
- To appreciate architecture as the development of changing ideas over time, and as the representation of their particular time and context. To be able to chart the change of ideas chronologically over time.
- To become familiar with and improve comprehension about architecture using theoretical texts and architectural criticism.

### Sessional Work:

Students are expected to read from short and long writings about architecture and communicate their comprehension in writing and discussions/presentation in class. It is suggested that texts from the following authors be used to build up a body of knowledge about architecture (this is only a representative list):

Vitruvius, Andrea Palladio, John Ruskin, Louis Sullivan, Adolf Loos, Le Corbusier, writings from the Bauhaus, Peter Blake, Philip Johnson, Charles Jencks, Robert Venturi, Adrian Forty, Christopher Alexander, Leon Krier, Kevin Lynch, Rem Koolhaas, Bjark Engels, Charles Correa, Romi Khosla,

# 320 College Projects 3

### Credits-3

Teaching Hours-54 periods of 50 minutes duration – 45 hours Sessional marks-

Internal- 100

External ----

(to be developed by individual colleges)

The following is a representative list of what may constitute college projects:

Seminars, Tutorials/ additional classes for any course, Guest Lectures, putting up Exhibitions, Workshops, participating in Architectural Competitions or conducting Site Visits or Study Tours.

2

### 321 Elective 3

### Credits-3

Teaching Hours

Studio- 54 periods of 50 minutes duration - 45 hours

Sessional marks-

Internal-100

External ----

(to be developed by individual colleges)

# Technology Studio

Credit and marks as per the scheme of examination for individual courses

Teaching Hours

Studio- 54 periods of 50 minutes duration - 45 hour

# **Objectives**

Integration of courses

Combined studio time

Technology studio is the studio time for students where guidance for technical courses will be available.

Combined Studio classes to be used for Sessional work for individual courses as well as for integration of courses

# DETAILS OF SCHEME OF EXAMINATION SEMESTER III TO BE CONDUCTED BY COLLEGES.

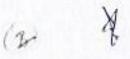
	Semester III	THEO	XAMINATION SESSIONAL MARKS							
	EXAMINATION Exam conducted by individual colleges					Internal		External		
SR NO	COURSES	No of papers	duration	Max. marks	Min. Marks for passing	Max. marks	Min. Marks for passing	Max Marks	Min. Marks For passing	Max. marks for the course
301	Architectural Design 3	_		-		100	50	100	50	200
302	Allied Design 3					100	50			100
303	Architectural Building Construction 3	1	3 HOURS	50	20	50	25		_	100
304	Theories and Design of Structures 3	1	2 HOURS	50	20	50	25	-	-	100
305	Humanities 3	1	2 HOURS	50	20	50	25			100
306	Environmental Studies 3	_			-	50	25,	-	-	50
307	Architectural Representation & Detailing ' 1	-	-	_	-	100	50	-	-	100
308	Architectural Building Servicesi	1	2 HOURS	50	20	50	25	_		100
309	Architectural Theories I		-			50	25	_		50
320	College projects					100	50	_		100
321	Elective 3					100	50			100
321	Total marks for t	he exa	mination	1		100	50			11

Total marks for the examination = 1100 Minimum marks for passing the examination= 550

# Scheme of Teaching and Examinations Bachelor of Architecture (B. Arch.) Semester IV

	Semester IV Exam conducted by individual colleges	Teaching	Scheme	Credits		
Sub No.	SUBJECTS	Lecture	Studio	Theory	Studio	Total
401	Architectural Design Studio		8		8	8
402	Allied Design Studio	THE STATE OF	3	Daniel E	3	3
403	Architectural Building Construction	3	3 classes	3	1	4
404	Theory and Design of Structures	2	technology	2	1	3
408	Architectural Building Services	2	studio	2	1	3
405	Humanities	3		3		3
407	Architectural Representation & Detailing	2	2	2	2	4
409	Architectural Theory	2				2
420	College projects		3			3
421	Elective		3			3
	Total	14	22	14	22	36

	Semester IV Exam Exam conducted by individual colleges	Examination Scheme						
Sub. No.	SUBJECTS	Theory (paper)	Internal	External viva	Total			
401	Architectural Design Studio		100	100	200			
402	Allied Design Studio		100		100			
403	Architectural Building Construction	50	50	S 1938	100			
404	Theory and Design of Structures	50	50		100			
408	Architectural Building Services	50	50		100			
405	Humanities	50	50		100			
407	Architectural Representation & Detailing -	INS I CAL	100		100			
409	Architectural Theory		50		50			
420	College projects		100		100			
421	Elective	100	100		100			
761	Total				1050			



# Syllabus (Course Content) for Second Year B. Arch. Semester IV

# 401 Achitectural Design Studio 4

### Credits-8

# Teaching Hours

Lectures-

Studio- 144 periods of 50 minutes duration -120 hours

#### Sessional marks-

Internal- 100

External --- 100

### Objectives:

- To develop research skills for survey research and case study.
- To understand functioning of community spaces in rural areas/semi urban areas
- To study principles of design, construction, and technology based on tradition and experience.

# Objectives of Design Projects

- To design spaces suitable for life style in rural/semi urban areas
- To conserve the natural surroundings and social fabric suitable for communities
- To design the buildings suitable to climatic conditions, by using local materials and traditional methods of construction.
- To understand and provide specific infrastructure required for communities.

# Design projects

Built and un built spaces for Cluster & Communities,

# 402 Allied Design Studio 4

### Credits-3

### Teaching Hours

Lectures

Studio- 54 periods of 50 minutes duration - 45 hours

### Sessional marks-

Internal- 100

External ----

The course content will be developed by the individual colleges as per their choice of Allied Design scheme.

# 403Architectural Building Construction & Materials 4

#### Credits-4

# Teaching Hours-

Lectures-54 periods of 50 minutes duration- 45 hours

Studio- 54 periods of 50 minutes duration- 45 hours to be conducted as technology studio (out of which 15hours are considered for credit calculation)

### Scheme of examination

Theory :One paper of three hours duration Max. marks- 50 Min marks for passing- 20

### Sessional marks-

Internal- 50 marks

External ----

# Objectives-

- Understanding concepts of framed structures in Steel for low medium span building
- Understanding methods of construction of various components of steel structures
- · Understanding concepts of trusses for low and medium spans
- Structural framing in STEEL for low rise medium span buildings.
- Foundation Systems, Floor Systems, Wall / Cladding Systems,
- 3. Roof Systems- concepts of trusses
- 4. Moisture and fire protections in STEEL framed low rise medium span buildings.

### Sessional work

Based on above in the form of drawings, sketches, case studies, Reports

### 404 Theory & Design of Structures 4

Credits-3

### Teaching Hours

Lectures- 36 periods of 50 minutes duration- 30 hours

Studio- 54 periods of 50 minutes duration- 45 hours to be conducted as technology studio (out of which 15 hours are considered for credit calculations)

### Scheme of examination

Theory -one paper of two hours duration Max. marks- 50 Min marks for passing- 20

### Sessional marks-

Internal-50

External ----

### Objectives:

Understanding of basic theories and principles of structural analysis Understanding of properties of materials relevant to structural analysis Understanding of behaviour of structural elements under various conditions

# 1. Analysis of short and long column

- a. Short & long columns, slenderness ratio etc.
- b. Euler's & Rankine's Theory

# 2 Analysis of fixed beams

- Advantages & disadvantages.
- Determination of negative & positive bending moments.
   (confine the loading to point & UDL covering full span only).

# 3 Analysis by moment distribution method

Continuous two span and three spans beams with UDL and Point loads with and without support settlement. Single storey and single bay non sway frame under UDL and point load. Comparison of the analysis results of simply supported, continuous and portal frame idealization of three dimensional structures.

# 4. Introduction to Steel Design

Basic information about different steel section used as structural members and steel table. Brief introduction to planning of low rise and low span steel structures

# 5. Soil Mechanics

- a. Importance of subject.
- b. Types of soil and their properties.
- c. Methods of compaction and consolidation.
- d. Void ratio, Porosity, Bulk density, Moisture content, Degree of saturation, Liquid limit, Plastic limit, etc.
- e. Test for assessing load bearing capacity of soil.
- f. Soil properties and characteristics relevant to the design of foundations.
- g. Criteria for selection of foundation type for different soil conditions.
- h. Effect of water level, settlement of soil.
- Failure of foundation systems.
- Improvement of soil properties.
- k. Design procedure for simple load bearing foundations.

### 6 Material testing

Coarse aggregate

Fineness modulus

Crushing test

Concrete

Compressive strength

Slump cone test

Mangalore tile

Flexure test



# 405 Humanities 4

### Credits-3

# Teaching Hours

Lectures- 54 periods of 50 minutes duration - 45 hours Studio- -----

### Scheme of examination

Theory -one paper of two hours duration Max. marks- 50 Min marks for passing- 20

### Sessional marks-

Internal- 50

External ---

# The study of the socio-cultural circumstances, the art and the architecture of the followings:

The rise of the Mahajanapadas
The organization of kingdoms
Art and architecture of the rock cut temples
Persian and Hellenistic influences

The Mauryas and the Guptas The legacy of Ashoka

The resurgence of Hinduism

The rise of the Shaivite and Vaishnavite traditions

The great temples of India, their design, evolution and significance

"Khajuraho, Konarak, Halebid, Belur, Somnathpur, Aihole, Badami, Pattadakkal

The Dravida Style \*

The Nagara Style ..

Temple towns -

Timber temple traditions of Kerala and Himachal Pradesh

The rise of the Vijayanagara empire

Development of state and domestic architecture in various parts of India

The rise of Islam

Timber mosques of Kerala

The influences of the Ghorid/ Ghaznavid invasions -

The establishment of the Sultanates

The Khaljis and Delhi

The later Sultanates: the Tughlaqs and the Lodhis- Art and architecture &



The Gujarat and Deccan sultanates- Art and architecture Rajput architecture

The Mughals

Babar and Humayun- Art and architecture
The interregnum of Sher Shah Suri
Akbar
His patronage, influence and syncretic legacy
Akbar's karkhanas of art, miniature painting and calligraphy
Akbar's architecture
Jehangir, Shahjehan and Aurangzeb- Art and architecture
The decline of the Mughals and the rise of regional powers

The establishment and influence of the East India Companies The Portuguese and Dutch influence The port cities of Calcutta, Madras and Bombay The architecture of the Presidency towns Company paintings

The uprising of 1857 and its aftermath
New British architecture in India
Neo-Classical architecture
Neo-Gothic architecture, its impact on Urbs Prima Indis

The influence of the Bombay School of Art on Art and architecture in the 19th century Indo-Saracenic architecture

The urban architecture of Bombay in the early 20th century
Art movements in the early 20th century in India
The first Indian Architectural practices
Art Deco in Bombay and India
Modernist impulses in art and architecture in the years leading to independence

# 407 Architectural Representation & Detailing 4 Credits-4

# Teaching Hours

Lectures-36 periods of 50 minutes duration-30 hours Studio-36 periods of 50 minutes duration - 30hours

### Sessional marks-

Internal- 100

External ----

# SURVEYING AND LEVELLING Objectives:

To Understand methods of survey, and documentation, Introduction to tools and equipments of Land surveying Introduction to modern methods of surveying

- Brief history of land surveys executed by Government Departments Information and working of land record offices
- 2. Reading of Survey maps, understanding of features and undulation of ground
- 3. Chain Survey and Triangulation

A study of instruments used for chain Survey Chains, Ranging Rods, Tapes, Optical square, Cylindrical cross staff

- B. Chain line ranging, Measurement of offsets in field book
- C. Recording of Chain survey measurements in field book
- D. Plotting of Chain survey, scales used in plotting
- E. Calculation of Area

### 4. Transverse Survey

- A. Instruments used Prismatic compass and Theodolite
- B. Recording measurements of prismatic compass survey, magnetic Meridian, Back, Fore, and reduced Bearings, Local attraction and its correction
- C. Plotting of Transverse survey, Elimination of closing error
- Various uses of Theodolite,

Finding out heights or distances of inaccessible structures

E. Lining out of large buildings, and roads

Sesssional Work-

Based upon above in the form of plates, drawings, class Tests



# 408 Architectural Building Services 2

### Credits- 3

# Teaching Hours

Lectures- 36 periods of 50 minutes duration- 30 hours

Studio- 54 periods of 50 minutes duration- 45 hours to be conducted as technology studio (out of 18 hours are considered for credit calculation)

# Scheme of examination

Theory -one paper of two hours duration Max. marks- 50 Min marks for passing- 20

### Sessional marks-

Internal-50

External ----

# Objectives:

Understanding of external services of water supply and drainage for the buildings, and site lay outs.

Systems of building drainage
Design of under ground drainage system
Use of inspection chambers and disconnecting chambers
Connection to municipal sewer, use of Drop manhole
Ventilation of drainage system
Sewage disposal systems for small projects

Roof drainage Site and surface drainage Rain water harvesting

Various traps used in site layouts

Sessional Work- Drainage lay out Surface drainage and rain water harvesting





# 409 Architectural Theory 2

Credits- 2

Teaching Hours

Lectures- 36 periods of 50 minutes duration 30 hours

Studio- ----

Sessional marks-

Internal-

50 marks

External ---

### WRITING

# Objective:

- To be able to write with clarity about architecture and ideas in architecture.
- 2. To be able to correctly use architectural terms to communicate architectural ideas.
- To be able to convey effectively in words the thinking behind one's own designs being carried out in various studios.
- To learn to use referencing and citation as an essential tool of writing, and to understand clearly issues and consequences of plagiarism.

Sessional Work: this semester sessional work may be carried out in the form of writing workshops leading to short and longer pieces of writing. Resources persons such as published writers, architectural journalists and academics may be invited to conduct these workshops and encourage interaction in writing and reading by the students themselves. Much of the resource material from the previous semester may be relied upon to ensure vertical continuity of the subject.

# 420 College Projects 4

Credits-3

Teaching Hours-54 periods of 50 minutes duration – 45 hours Sessional marks-

Internal- 100

External ----

(to be developed by individual colleges)

The following is a representative list of what may constitute college projects:

Seminars, Tutorials/ additional classes for any course, Guest Lectures, putting up Exhibitions, Workshops, participating in Architectural Competitions or conducting Site Visits or Study Tours.

# 421 Elective 4

### Credits-3

Teaching Hours

Studio- 54 periods of 50 minutes duration - 45 hours

Sessional marks-

Internal- 100

External ----

(to be developed by individual colleges)

# Technology Studio

Credit and marks as per the scheme of examination for individual courses

Teaching Hours

Studio- 54 periods of 50 minutes duration - 45 hour

# **Objectives**

Integration of courses Combined studio time

Technology studio is the studio time for students where guidance for technical courses will be available.

Combined Studio classes to be used for Sessional work for individual courses as well as for integration of courses

# DETAILS OF SCHEME OF EXAMINATION SEMESTER IV TO BE CONDUCTED BY COLLEGES,

	Semester IV	IV THEORY					SESSIONAL MARKS			
	EXAMINATION Exam conducted by individual colleges					Internal		External		
SR NO	COURSES	No of papers	duration	Max. marks	Min. Marks for passing	Max. marks	Min. Marks for passing	Max Marks	Min. Marks For passing	Max. marks for the course
401	Architectural Design 4		-		-	100	50	100	50	200
402	Allied Design 4					100	50		-	100
403	Architectural Building Construction 4	1	3 HOURS	50	20	50	25	_	<u></u>	100
404	Theory and Design of Structures 4	1	2HOURS	50	20	50	25	-	-	100
405	Humanities 4	1	2HOURS	50	20	50	25			100
407	Architectural Representation & Detailing 4	-			_	100	50	-		100
408	Architectural Building Services2	1	2HOURS	50	20	50	25	_	_	100
409	Architectural Theories 2				_	50	25	-		50
420	College projects 4	_	-	222	_	100	50	-	-	100
421	Elective 4				_	100	50			100

Notes: Theory, internal sessional work, and external viva are considered as separate heads of passing

Total marks for the examination = 1050 Minimum marks for passing the examination= 525