MAHARASHTRA STATE BOARD OF VOCATIONAL EXAMINATION, MUMBAI

1	Name of Syllabus	**C. C. In Professional drafting using Auto CAD (304214)**
2	Max.Nos of Student	25 Students
3	Duration	1 Year
4	Type	Full Time
5	Nos Of Days / Week	6 Days
6	Nos Of Hours /Days	7 Hrs
7	Space Required	Workshop = 900 Sq feet Class Room = 200 Sq feet TOTAL = 1100 Sq feet
8	Entry Qualification	S.S.C. Appear
9	Objective Of Syllabus/ introduction	**To get Knowledge of Building Construction, To Understanding Building Drawing, To Prepare Estimate, To Prepare Building Drawing on CAD, To Prepare Other Construction Drawing.**
10	Employment Opportunity	**Office of Architect, Office of Consultant Civil Engineer, Office of Builder, any Civil Engineering Ferm, his own practice as Draughtsman Civil**
11	Teacher's Qualification	**For Vocational subject - B.E.Civil**
12	Training System	**Training System Per Week** Theory: 12 Hours; Practical: 30 Hours; Total: 42 Hours
13	Exam. System	

SR. NO.	PAPER CODE	NAME OF SUBJECT	TH/PR	HOURS	MAX. MARKS	MIN. MARKS
1	30421411	BASIC MATHS AND BUILDING MATERIALS FOR CONSTRUCTION	TH-I	3 HRS	100	35
2	30421412	BUILDING DRAWING AND CAD	TH-II	3 HRS	100	35
3	30421413	CONSTRUCTION ESTIMATING, COSTING AND ACCOUNTS	TH-III	3 HRS	100	35
4	30421421	COMPUTER BASIC AND HARDWARE MAINTENANCE	PR-I	3 HRS	100	50
5	30421422	DRAFTING TECHNIQUES USING AUTOCAD	PR-II	3 HRS	100	50
6	30421423	BUILDING DRAWING AND 3D MAX AND PHOTOSHOP SOFTWARE'S	PR-III	3 HRS	100	50
		TOTAL			600	255

THEORY - I - BASIC MATHS AND BUILDING MATERIALS FOR CONSTRUCTION

SECTION A - BASIC MATHS

Detailed Syllabus:

1.0 Trigonometric ratios

1.1. Angles & its measurements
1.2. Trigonometric ratios
1.3. Relation between degree and radian.
1.4. Fundamental identities.
1.5. Examples based on Fundamental Identities
1.6. Trigonometric ratios of compound angles
1.7. Factorization formulae
1.8. Inverse trigonometric functions
1.9. Properties of a Triangle
1.10 Conversion of radian to degree and vice versa

2.0. Plane co-ordinate geometry

2.1. Locus
2.2. Line

3.0 Vectors and Linear Equalities

3.1. Definition of vector, position vector
3.2. Algebra of vectors (Equality, addition, subtraction and scalar multiplication)
3.3. Dot (Scalar) product with properties.
3.4. Vector (Cross) product with properties.

4.0. Determinants and Matrices

4.1. Definition and expansion of determinants of order 2 and 3.
4.2. Cramer's rule to solve simultaneous equations in 2 and 3 unknowns
4.3. Definition of a matrix of order m x n.
4.4. Types of matrices.
4.5. Algebra of matrices such as equality, addition, Subtraction, scalar multiplication and Multiplication

5.0 Units

5.1. Introduction to length, area, volume, moment of Inertia, force, force per unit length.
5.2. Length conversions.
5.3. Area conversions

6.0. Logarithms

6.1. Introduction and Definition
6.2. Laws of logarithms
6.3. Numerical problems based on multiplication, division and power.

7.0. Geometry

7.1. Pair of straight lines passing & not passing through origin
7.2. Circle: definition, Tangent and Normal
7.3. Conic: Equation of Conics
7.4. Three Dimensional Geometry: Direction Cosines and ratios, Line, Plane

8.0. Measurement, Units, and Dimension

8.1. Introduction: Need for measurement, Units and documents, accuracy, precision of measuring instruments.
8.2 Types of Errors: Constant error, systematic error, environment error (errors due to external causes).Error due to imperfection, random error, gross error, percentage error.
8.3 Combination of Error: Error due to addition, subtraction, multiplication, division, powers of observed quantities.
8.4 Units and Dimensions: Fundamental and derived physical quantities, systems of units in SI systems. Rules for writing units in SI, derived units in SI. Multiples and submultiples of SI units.
8.5 Dimensions: dimensional formulae and dimensional equations, dimensional constants and dimensionless quantities, principle of homogeneity of dimensions.
8.6 Application of dimensional method of analysis: Conversion of one system of units into another, to check the correctness of an equation, to derive the relationship between different physical quantities.
8.7 Order of magnitude and significant figures
8.8 Concept of accuracy and estimation of errors

SECTION B

BUILDING MATERIALS FOR CONSTRUCTION

Chapter 1: Stone and Coarse Aggregate

1.1. Classifications of Rocks
1.2. Quarrying for stone
1.3. Commonly used stones in building
1.4. Requirements of good building stone
1.5. Common sizes of coarse Aggregate used in concrete

Chapter 2: Bricks

2.1. Study of earth (Soils) used in manufacturing of Brick
2.2. Classification of Bricks
2.3. Properties of a good Brick
2.4. Other types of Brick

Chapter 3: Cement

3.1 Grades of cement as per IS 12269 – 1987,IS 8182 - 1989 and IS 289 - 1989
3.2 Ingredients of Cement, Manufacture of Cement (only introduction)
3.3 Various Types of Cements and its uses

Chapter 4: Fine Aggregates

4.1. Types of fine aggregates used in preparation of cement mortar and concrete
4.2. Sources of fine aggregate
4.3. Properties of River Sand

Chapter 5: Cement Mortar

5.1. Ingredients of Cement Mortar
5.2. Preparation of Cement Mortar – Hand Mixing, Machine Mixing – Advantages and Disadvantages
5.3. Various Proportions of Cement Mortar
5.4. Lime Mortar, its properties and use

Chapter 6: Concrete

6.1) Ingredients of Concrete
6.2) Types of Concrete Plain Cement Concrete, (PCC) and Reinforced cement concrete (RCC)
6.3) various proportion of Concrete and its uses, batching of concrete- Volume batching and weigh batching

Chapter 7: Steel

7.1) Types of steel used in RCC as per ISI
7.2) High Tensile Steel its properties, study of IS 1786
7.3) cover for steel as per IS 456 - 2000
7.4) Types of sections used in Steel Structure and its properties
7.5) Rolled steel Joist of different sections and its uses

Chapter 8: Flooring Tiles

8.1) Shahabad Tiles, Kotah Tiles, Cuddappa Tiles,Marble Tiles, Granite, its occurrence, Sources of availability and its uses
8.2) Cement tiles, marble mosaic tiles, chequered tiles-and its uses
8.3) Ceramic Tiles, Normal sizes& its uses

Chapter 9: Reinforced Cement Concrete

9.1) Different types of RCC members Definitions, its properties and its locations
9.2) Ingredients of for R. C. C. Concrete
9.3) Shape and types of Reinforcing steel bars used in RCC members. Explain Terms used - Cutting of bar; Straightening of bar; Bending of bar; Hooking of bar; lapping of bar, Binding of bars, use of G.I. wire, Cover for bars.
9.4) Standard Hook length for plan M. S. Bar Standard length of "EL" for Torque steel bar
9.5)Joints in RCC work, Necessity, Types of joints in RCC work, Construction Joint, Expansion Joint, location of joints, Material used, & Procedure of construction of Providing Joints.

Chapter 10: Foundation

1) Necessity and Purpose of Foundation
2) Shallow Foundation
3) Spread Foundation
4) Footing for load Bearing Structure
5) Column Footing and combined Footing
6) Raft Foundation
7) Grillage Foundation
8) Deep Foundation and its types
9) Cast in-situ R.C.C. Concrete pile
10) Pre cast concrete piles
11) Foundation in Black cotton soil, under reamed pile

Theory: Only types of foundation and there study of detailing expected.
This will not include any theory or design of foundation

Chapter 11: Brick Masonry

1) Terms used in Brick Masonry.
2) Construction of Brick Masonry in English bond and Flemish Bond in cement mortar.
3) Brick Masonry stretcher bond and half brick thick masonry.
4) Hollow and solid concrete block masonry
5) Fixing of Door and window Frame in masonry
6) Brief information of Siporex block masonry
7) Brief information of Concrete Block masonry

Chapter 12: Scaffolding

1) Purpose and Necessity of Scaffolding
2) Single and Double Scaffolding, name of part serecting Scaffolding.
3) Materials used for Scaffolding, Tubular steel scaffolding

Chapter 13: Lintels and Sills

1) Necessity of lintels
2) R.C.C. Lintels
3) Jambs, Sills, Head cladding, its purpose, materials used and construction procedures.

Stairs: 14

1) Definitions of Terms used in Stair.
2) Classification of stairs based on shape and materials used for construction.
3) Requirements of good stairs
4) Hand Rails Types and Fixing ProcedureRoofs: 15

1. Definition & Purpose of Roof
2. Technical Terms used in Roof
3. Types of Roofs
4.1 Pitched Roof
5. Lean to Roof
6 Couple Roof
7. King Post Truss and Queen Post Truss

Theory: Only brief technical understanding and pictorial understanding expected. Design of the staircase not expected.

THEORY - II - BUILDING DRAWING AND CAD

A] Building Drawing

Chapter 1: Introduction to Drawing

1.1) Different Drawing Instrument and their use
1.2) Letters its types, Sizes and its use in Drawing
1.3) Convention of different lines
1.4) Giving dimensions
1.5) Scales and its uses
1.6) Study of IS 962

Chapter 2: Orthographic Projection

2.1) Introduction to orthographic projections
2.2) First Angle Projections Method
2.3) Third Angle Projections Method
2.4) Drawing orthographic Projections of simple pictorial view

Chapter 3: Isometric View

3.1) Method of Preparing Isometric Views
3.2) Isometric View of Rectangular Objects
3.3) Isometric View of Circular Objects
3.4) Isometric View of Building

Chapter 4: Building Drawing

Dimensions and Details of Foundation C/S. DPC,Different Types of Door and Windows, Roof Trusses, Flooring C/S, Staircase, Brick Masonry, Lintel, Arches, Chajja, C/S details of RCC Chajja, Lintel, Beam, Footing, Column, Slab, Pardi,
Staircase etc.

Chapter 5: Building By Laws and Standard Norms

5.1) Definitions of Plot Area, Plinth Area, Built up Area, Carpet Area, Floor Space Index (FSI)
5.2) Permissible Built up Area for Residential Bldg., Public Building
5.3) Definition of Marginal Distance and their necessity, Normal Marginal Distances provided for Residential Buildings
5.4) Definition and Necessity of Building Line, Development Line
5.5) Min Dimensions for following
5.6) Plinth height, Sill height, Head Room in Residential Bldg, Public Buildings, Mezzanine floor, Basements and stilts for car parking
5.7) Minimum Dimensions of: Living Room, Bed Room, Master Bed Room, W.C. Bath, and Toilet.
3.7.1) Min. Width for passage and Balcony
5.8) Rules for Window Opening
5.9) Min. width of step and Landing, Head Room, Thumb Rules for fixing Rise and Tread.
5.10) Permissible Height of Pardi, of Building as per FSI and Road Width.

Chapter 6: Development of Line Plan of a Building

6.1) Symbols and notations as per BIS 696 in Civil Engg. Drawing.
6.2) Preparing Line Plan of Building, necessity of Preparing line plan.
6.3) Development of Plan of Residential Building having living Room, Kitchen Room, Bed Room, Bath room and w.c. with slab. Draw to scale –Plan, Elevation Sections in 3 directions
6.4) Working drawings and its necessity.

THEORY - III - CONSTRUCTION ESTIMATING, COSTING AND ACCOUNTS

Introduction

Chapter No 1 Meaning of Term Estimating, costing Types of Estimate

1. Approximate Estimate
2. Details Estimate

Chapter No 2 Approximate Estimate

2.1 Definition of approximate estimate
2.2 Uses of Approximate Estimate
2.3 Preparing Approximate Estimate for Building Methods of preparing Approximate Estimate for Buildings
2.3.1 Plinth Area Method
2.3.2 Cubical Unit
2.3.3 Service Unit
2.3.4 Bay Unit

Chapter No 3 Detail Estimate

3.1 Definition of Detail Estimate
3.2 Uses of Detail Estimate
3.3 Data required preparing detailed estimate
3.4 Procedure of preparing detailed estimate of any work
3.4.1 Taking out quantities and entering the data in measurement sheet and completing abstract sheet.
3.4.2 Abstracting using Abstract sheet
List of items with their unit of measurement.
Definition of contingencies, work charge establishment
Provisions in details estimate for sanitary, water supply, Electrification. Types of Estimates, Detail Estimate, Revised Estimate, Supplementary Estimate, Annual report and Maintenance Estimate, Special Report Estimate, Additions and Alteration Estimate.
Procedure of calculating Quantities for excavation, Foundation concrete, Foundation & plinth Masonry, Super Structure Masonry using Long wall – Short Wall method Center Line Method Rules for Deduction in concrete, Masonry, Pointing & Plastering, Painting, Multiplying factor related to oil painting

Chapter No. 4: Working out of quantities of Steel for R.C.C work

1 Division of R.C.C work into concrete Steel and Form work
2 Study of Reinforced steel for Bar diameter, its Weight
3 Calculating Length and weight of steel for
3.1 Straight bas with hook or El at ends
3.2 Bent up bar with hook or EL at ends
3.3 Stirups
3.4 preparing bar bending schedule and calculating
Steel for: Footing, Column, Lintel, Beam, Slab, Chajja , Staircase etc

Chapter No. 5: Modes of Measurements

1Points Considered while fixing unit of measurement
2Modes of measurements of item of work as per IS1200
3Desired Accuracy of measurement

Chapter No. 6: Rate Analysis

1Meaning of Term Rate Analysis
2Necessity of Rate Analysis
3Factors affecting Rate analysis
4 Rates of Material and Labor as per DSR.
5Definition of Task work and factors affecting it. Task work for Excavation, Brick Masonry, Plastering, Wood work, centering & formwork, Steel work for RCC, Plain Concrete and RCC
6 Methods of payment to labor.
7Transportation of material and its effect on rate analysis, Lead & lift
8 Preparing Rate Analysis of minimum 10 items, such As Excavation, Brick Masonry, Plastering, Wood work, Centering & formwork, Steel work for RCC, Plain Concrete and RCC
9Standard schedule of Rate.

Chapter 7: Specifications

1Necessity of Specification
2Points to be observed while framing specifications
3Types of Specifications General, Details, Standard and manufactures Specifications
6.4 Writing detailed Specifications of minimum 5 important items of building work
5Study of Standard specification Book from organizations such as PWD, MHADA, CIDCO etc.

Chapter 8: Tender Document & Tender Notice

1List of Tenders document
2Necessity of Tender
3Points to be observed while framing Tender Notice
4Drafting of Tenders Notice
5Explanation of Terms: Earned Money, Security Deposit, Validity Period, Right for Rejection of one or all tenders
6Corrigendum to Tenders Notice
7Procedure of Submitting filled Tender
8Opening of Tender, Scrutiny of Tender
9Comparative Statement, Finalizing Tender
10 Work order
11 Rejection of all tenders
12 Rejections of Lowest Tenders
13 Unbalanced Tender, Ring formations, Negotiations
14 Point to be observed by contractor while filling a tender.

Chapter 9: Conditions of Contract

9.1. Contract - Definition, its necessity and types
9.2. General Conditions of contract
- 2.1 Special conditions of contract
- 2.2 Contract Drawing
- 2.3 Bill of Quantity
- 2.4 site possession for execution
- 2.5 Inspection of Materials
- 2.6 Inspection of completed item of works
- 2.7 Water charges and Light Charges
- 2.8 Working on Holiday
- 2.9 Extension of Time Limit
- 2.10 Termination of Contract
- 2.11 Subletting of work
- 2.12 Suspension of work
- 2.13 Extra Item
- 2.14 Payment to contractor
- 2.15 Clearance of file & Completion Certificate
- 2.16 Defects Liability Period
- 2.17 Price Escalation Clause
- 2.18 Adherence to labor laws
- 2.19 Arbitration

9.3 Reward / Penalty clause

Chapter 10: Payment to Contractors

10.1Modes of Payment to contractor
10.1.1 Interim payments and its necessity
10.2Types of interim payment
10.2.1 Advance payment
10.2.2 Secured Advance Payment
10.2.3 On Account Payment
10.3Final Payment
10.4First & final Payment
10.5Retention Money and its Necessity
10.6Reduced Rate Payment
10.7Petty advance
10.8Mobilization Advance
10.9Measurement Book
10.10 Indent Invoice
10.11 Recoveries

Chapter 11: Procedure of Execution of work in P.W.D.

11.1 Organization set up of PWD
11.2 PWD procedure of initiating work, Administrative Approval, Technical Sanction, Expenditure section, Budget Provision
11.3Methods of executing work
11.3.1 Contract Method
11.3.2 Departmental Method, Nominal Muster Roll
11.3.3 Rate List Method
11.3.4 Piece Work Method
11.3.5 Day Work Method

PRACTICAL - I - COMPUTER BASIC AND HARDWARE MAINTENANCE

Detailed Syllabus:

1.0. Introduction

1.1. Basic Computer and its structural theory
1.2. Input devices
1.3. Output devices
1.4. Storage devices
1.5. Computer types and their applications
1.6. Computer Software/Hardware
1.7. Identification of Keyboard, Printer, Monitor Scanner, Webcam, Microphone, Speaker

2.0. Operating systems

2.1. Various types of Operating systems
2.2. Comparison between the different types of OS
2.3. Network Operating systems and their features
2.4. Microsoft Windows, development & growth of MS Windows, features
2.5. System requirements for various Operating Systems
2.6. Installation of MS Windows
2.7. Practice on Add/Remove programs

3.0. Microsoft Word

3.1. Introduction to MS Office
3.2. MS Word applications
3.3 Creation of Document and file operations
3.4. Formatting features of document
3.5. Modification/ editing documents
3.6. Inserting images, files, tables, symbols and various attributes
3.7. Creating and formatting of tables
3.8. Mail merge
3.9. Page layout and design features
3.10. Spell & grammar check in documents
3.10. Print preview & printing of documents
3.11. Converting documents to PDF files
3.12. Create and save a document
3.13. Format the text with different fontsize, font styles
3.14. Setting up different page sizes, orientation.
3.15. Making various type of documents like Bio Data, letters, project reports
3.16. Printing of documents

4.0. Microsoft Excel

4.1. Introduction to Excel and its applications
4.2. Features of MS Excel
4.3. Outline of Worksheet & Workbook
4.4. Data types
4.5. Study of various menus of MS Excel
4.6. Creation of worksheet, editing worksheets, save, copy & deleting worksheets.

5.0. MS Power point

5.1. General Introduction
5.2. Features & Applications of MS Power point
5.3. Creating Presentations
5.4. Study of different layouts and making presentations using different layouts
5.5. Power Point practice
5.6. Create Slides of different types
5.7. Running presentations.
5.8. Add slide transition effects and run slide show
5.9. Printing PPT files

6.0. Networking & Internet Utilities

6.1. General Introduction of Computer Networking
6.2. Requirements/ Applications of Computer Networking
6.3. Layouts of Different Networks
6.4. Study of various Networking components
6.5. Limitations and merits of different topologies
6.6. Study of Server/client concept
6.7. Internet & its applications
6.8. Email and Chatting
6.9. Downloading files (Text and media files)
6.10. Networking practice
6.11. Identifying different network components
6.12. Collecting samples, charts, images of different networking components.
6.13. Installation of Network Interface card
6.14. Getting connected to Internet and accessing the internet
6.15. Creating personalized Email account
6.16. Chatting (Text and Voice chat)
6.17. Searching/surfing for the information in different sites.
6.18. Downloading

PRACTICAL - II - DRAFTING TECHNIQUES USING AUTOCAD.

CHAPTER 1

1.1 Aspects of structural drafting.
1.2 Aspects of architectural drafting.
1.3 Aspects of drafting for precast and prefab members
1.4 Aspects of floor shop drawings for mechanical sectors.
1.5 Aspects of electrical and landscape layouts.

CHAPTER 2 Structural Drafting

1.6 Drafting of various types of footing.
1.7 Drafting of various detailing as per IS-13920.
1.8 Drafting of various sections thru staircases.
1.9 Drafting of detailing for industrial sheds.
1.10 A complete R.C.C and steel building drafting project

CHAPTER 3 Architectural Drafting

1.11 Drafting of various plans. Their sections elevations and perspectives.
1.12 Drafting of centerline and face line plans.
1.13 Drafting of complete submission drawings.
1.14 Drafting of electrical and landscape layouts.

CHAPTER 4 Advance Drafting techniques.

2.1 Drafting machine drawings
2.2 Drafting of various shop floor drawings
2.3 Drafting of various connection drawings
2.4 Drafting of various machine foundation drawings
2.5 Drafting of various precast detailing.
2.6 Drafting of various prefab detailing.

PRACTICAL - III - BUILDING DRAWING AND 3D MAX AND PHOTOSHOP SOFTWARE'S.

SECTION A

ASSIGNMENT 1

1) Prepare Sheet on lettering
2) Prepare Sheet on lines
3) Prepare Sheets on Geometrical Construction
4) Prepare Sheets on Conventional Sign and Symbols

ASSIGNMENT 2

1) 1st Angle Projections ---------- 2 Solids
2) 3rd Angle Projections ---------- 2 Solids

ASSIGNMENT 3

1) Isometric View of Rectangular Objects
2) Isometric Vies of Circular Objects
3) Isometric View of Building

ASSIGNMENT 4

Detailed Drawing of Foundation C/S. DPC, Different
Types of Door and Windows, Roof Trusses,
Flooring C/S, Staircase, Brick Masonry, Lintel,
Arches, Chajja, C/S details of RCC Chajja, Lintel,
Beam, Footing, Column, Slab, Pardi, Staircase etc.

ASSIGNMENT 5

1) Student to Draw for A Residential. Bungalow
(Load Bearing) i.e. minimum 2 Bedrooms (one Bed room with attached Toilet), 1Hall, 1Kitchen, Veranda, Staircase, Toilet block, and Car Parking.
a) Plan,
b) Elevation
c) Two sections
d) Schedule of door and window
e) Site plan,
f) Area statement,
g) Construction notes.
h) Schedule of finishes

2) Draw tracing of above drawing
3) Prepare ammonia sheet
4) Prepare a working drawing for Staircase, Toilet block and kitchen

SECTION :- B

COURSE – 3D MAX/PHOTOSHOP

Max Interface, Navigation, Menus, UI, Viewport, Shortcuts, Selection Tools, Transformation Tools - NO ASSIGNMENT TODAY
No Assignment

2D Modeling, Basic Shapes, Converting 2D to 3D Shapes using tools like Lathe, Extrude, Bevel Profile - Assignment on 2D Modeling
Faculty must make a complex 2D object in front of the class for demo along with complete explanation
Assignment on 2D Shapes – Basic furniture/household items, temple, roman architecture, etc.(Any one of the above)

3D Parametrics - Standard Primitives, Extended Primitives
Assignment on 3D – Complete Drawing Room with furniture

Compound Objects - Boolean, Loft, Terrain, Connect, Scatter
Assignment - Grass and Stars, Bottle, Glass

Modifiers - All Parametric Modifiers
No Assignment

Array, Spacing, Basics of Rendering, Export/Import, Copy Paste, Mirror, Align,
No Assignment

Spline Modeling - Cover Snapping, Parameters of Spline Tool
Assignment on Spline Modeling – Making a bottle and chess set

Polygon Modeling 1 - Explain different tools to students while making a Non-organic object , Furniture, household items, etc)
Show a video with good organic models and discuss the Artwork
Assignment on Polygon Modeling 1(Inorganic) – Making household items, etc

Materials1 - Explanation of material Editor Window, Assigning Material, Material Slots, Shaders, Extended Parameters, Explanation about maps
Explain the usage and importance of materials - Demonstrate visuals to show some good complex material work

Photoshop1 - Interface, File Formats, Basic Tools
No Assignment

Photoshop2 - Image Editing, layers, layer styles, text
No Assignment

Photoshop3 - Filters, Exporting/ Importing
No Assigment

Materials2 - Demonstrate working on Blend, Raytrace, Composite, Shellac, Ink and Paint, Architectural Material, bumps, diffuse.
Explanation of Maps like Bitmap, noise, mask, opacity, mix.
Assignment on Basic Materials - Apply different materials to the models that have been created by students in their modeling classes.

Lights 1 - Standard Lights, Three Point Lighting System, Attenuation, Decay, Exposure Control
Explain std. lights, 3 point lighting system using Real world examples (Iluminating a room interior, etc). Demonstrate uses of Attenuation and Decay
Show the difference between different kinds of lights (Photometric and Std.)
Explanation on scaling lights, shadow map parameters, volume light and projection
Assignment - Illuminating a movie hall;

Lights 2 - Exterior lighting, sky light, advanced lighting, overview of Mental Ray
Details of sky light and light tracer, working on Mental Ray
Assignment - Illuminating an exterior scene and making a room using Mental Ray renderer (explain caustics, Mental Ray Material, final gather)

Camera and Render - Explain camera principles and shots
Create camera target/ free, parametrics. Render options (scan line, quick render, and render output to file). Other renderers might also be covered (VRAY, Arnold, etc.)
Also explain export of animation and different formats

Animation 1 - Traditional principles of Animation; theory; Graph Editor overview; Track Bar; Timeline; Curve Editor, Euler Controller
Explain the 12 laws of animation, give overview of graph editor and curve editor, explain the options of timeline and track bar
Introduce Motion Panel, and explain Euler Controller.
Assignment: None

Animation 2 - Parametric Animation (Bend), Transformational Animation, Morphing
Explain Animation using modifiers like Bend, Twist, FFD, Noise, Wave, etc.
Assignment: None

Rendering - Rendering concepts, Single frame and Multi-frame rendering, rendering animation

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