E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with „A" Grade | Accredited by NBA (CSE,EEE,MECH,CIVIL,ECE,IT)

NAGAPATTINAM – 611 002

B.E. Civil Engineering

Full Time Curriculum and Syllabus

Second Year – Fourth Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1901MA401	Engineering MathematicsIII	3	2	0	4	40	60	100
1902CE401	Building Materials and Management	3	0	0	3	40	60	100
1902CE402	Soil Mechanics	3	0	0	3	40	60	100
1902CE403	Transportation Engineering	3	0	0	3	40	60	100
1902CE404	Concrete Technology	3	0	0	3	40	60	100
1901CE405	Biology for Engineers	3	0	0	3	40	60	100
LaboratoryCourse								
1902CE451	Computer Aided Building and Drawing Lab	0	0	2	1	50	50	100
1902CE452	Soil Mechanics Lab	0	0	2	1	50	50	100
1904GE451	Life Skills: Verbal Ability	0	0	2	1	100	-	100
Audit Course								
1901MCX02	Indian Constitution	3	0	0	0	-	-	-

L – Lecture | T – Tutorial | P – Practical | C – Credit | CA – Continuous Assessment | ES – End Semester

1901MA401	ENGINEERING MATHEMATICS III	L	T	P	C
		3	2	0	4
UNIT I	**FOURIER SERIES**				**12 Hours**
Dirichlet'sconditions–GeneralFourierseries–Oddandevenfunctions–Halfrangesineseries–Halfrange cosine series–Parseval'sidentity– Harmonic analysis – Simple Applications					
UNIT II	**FOURIER TRANSFORMS**				**12 Hours**
Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms ofsimple functions – Convolution theorem– Parseval'sidentity					
UNIT III	**BASIC STATISTICS AND PROBABILITY**				**12 Hours**
Statistics – Definition, Types. Types of variables – Organising data - Descriptive Measures. Basic definitions and rules for probability, conditional probability independence of events, Baye's theorem, and random variables.					
UNIT IV	**TESTING OF HYPOTHESIS**				**12 Hours**
Large sample test based on Normal distribution for single mean and difference of means - Tests based on t and F distributions for testing means and variances – Contingency table (Test for Independency) – Goodness of fit.					
UNIT V	**DESIGN OF EXPERIMENTS**				**12 Hours**
One way and two way classifications – Completely randomized design – Randomized block design –Latin square design -factorial design.					
		TOTAL:			**60Hours**

REFERENCES:

1. Veerarajan. T., "Transforms and Partial Differential Equations", Second reprint, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2012
2. Grewal. B.S., "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, Delhi, 2012.
3. Walpole R.E. Myers S.L ,Ye.K, "Probability and statistics for Engg and scientists", 8th edition Pearson education,2007
4. P.N.Arora., S.Arora., " Statistics for Management".,S.Chand ltd, 2009
5. M.B.K.Moorthy., " Probability and Statistics"., Scitech Publications (India) Pvt Ltd ,December 1,2 011
6. www.nptelvideos.in/2012/11/mathematics-iii.html

1902CE401	BUILDING MATERIALS AND MANAGEMENT	L	T	P	C
		3	0	0	3

UNIT I	BUILDING MATERIALS	9 Hours

Lime, Brick,Timber and its Products, Floor and Wall Tiles, Pozzolanas, Ferrous metals, Thermal Insulation Material. Finishing Materials: Glass, Timber, Aluminium, Plastics, Paints, Varnishes, Distemper, Waterproofing and Damp Proofing Materials, Ferrocement and its application, Fibre textiles – Geo membranes and Geotextiles for earth reinforcement.

UNIT II	BUILDING COMPONENTS	9 Hours

Partition wall and Cavity wall, Composite Masonry, Doors, Windows, Ventilators, Stairs, Lift, Ramps, Escalators, Anti Termite Treatment, Brick masonry- Bond- Jointing-Stone masonry
Temporary building structures - Site Clearance - Marking –Earthwork, Slip and moving forms, scaffolding, Plumbing and Sanitation, Fire Protection, Introduction to Building Maintenance, Acoustics and Sound Insulation.

UNIT III	SUB STRUCTURE AND SUPERSTRUCTURE TECHNIQUES	9 Hours

Techniques of box jacking- pipe jacking- under water construction of diaphragm walls and basement Tunneling techniques, caisson -sinking cofferdam, Dewatering and stand by plant equipment for underground open excavation, Launching girders, bridge decks, off shore platforms, braced domes and space decks.

UNIT IV	CONSTRUCTION EQUIPMENTS	9 Hours

Selection of equipment for earth work - types of earthwork equipment, Equipment for material handling and erection of structures, Equipment for dredging, trenching, tunneling, Equipment for compaction, batching and mixing and concreting, Equipment for foundation and pile driving.

UNIT V	MANAGEMENT	9 Hours

Materials Management - Material Procurement and Delivery - Inventory Control - Tradeoffs of Costs in Materials Management.

	Total:	45 Hours

REFERENCES:

1. Varghese.P.C, "Building Materials", PHI Learning Pvt. Ltd, New Delhi, 2012.
2. Rajput. R.K., "Engineering Materials", S. Chand and Company Ltd., 2008.
3.Gambhir.M.L., "Concrete Technology", 3rd Edition, Tata McGraw Hill Education, 2004
4. Duggal.S.K., "Building Materials", 4th Edition, New Age International, 2008.
5.Jagadish.K.S, "Alternative Building Materials Technology", New Age International, 2007.
6.Gambhir. M.L., &NehaJamwal., "Building Materials, products, properties and systems", Tata McGraw Hill Educations Pvt. Ltd, New Delhi, 2012.

Online sources:

1.https://www.classcentral.com/course/swayam-basic-construction-materials-22914
2.https://www.classcentral.com/course/swayam-construction-methods-and-equipment-management-22940
3.https://nptel.ac.in/courses/105/102/105102088/
4.https://freevideolectures.com/course/86/building-materials-and-construction

1902CE402	SOIL MECHANICS	L	T	P	C
		3	0	0	3

UNIT I	INTRODUCTION	9 Hours

Definition of soil and soil mechanics – Formation of soil – types of soil – Three phase system of soil and their relationships – Specific gravity – Definition – Determination – Field density - sand replacement and core cutter method.

UNIT II	INDEX PROPERTIES AND SOIL CLASSIFIATION	9 Hours

Classification of soil – Grain size analysis – Stoke‟s law and hydrometer analysis– Consistency of soils – Atterberg‟s limit - Liquid limit, Plastic limit and Shrinkage limit – Determination - plasticity index, liquidity index , consistency index ,shrinkage ratio, flow index and toughness index – Classification of coarse grained and fine grained soil as per BIS.

UNIT III	PERMEABILITY AND SEEPAGE	9 Hours

Permeability –Definition – Assumption - one dimensional flow through soil – Darcy‟slaw – Limitations - Discharge velocity and seepage velocity – factors affecting the permeability – permeability determination - lab and field methods – permeability in stratified soil deposits – Introduction of flow net and itsproperties - application of flow net.

UNIT IV	COMPACTION AND CONSOLIDATION	9 Hours

Compaction–fieldandlabmethods–Proctor‟stest–factorsaffectingthecompaction–effectofcompaction in soilproperties–Consolidation –Terzaghi‟stheoryofonedimensionalconsolidation -partialdifferential equation (no analytical solution) – Lab method - coefficient of consolidation – Determination - √t and log t methods.

UNIT V	STRESS DISTRIBUTION AND SHEAR STRENGTH	9 Hours

Introduction – stresses in soil – concept of effective and neutral stresses – stress distribution in soil media – Boussinesq analysis – Point load, Uniformly distributed load, line load – rectangular load - pressure bulb – Newmark‟s chart – Introduction. Shear strength – shear strength of cohesive and cohesion less soils – Mohr coulomb‟s theory –Direct shear, Triaxial, unconfined shear strength - factors affecting the shear strength.

Total:	45 hours

REFERENCES:

1. Raju .K.V.B .and Ravichandran .P.T, “Mechanics of Soils”, AyyappaaPublications, 2000.
2. Punmia .B.C, “Soil Mechanics and Foundations”, Laxmi Publications Pvt.Ltd., 2005.
3. GopalRanjan and Rao .A.S.R, “Basic and Applied Soil Mechanics”, New age international (p) Ltd., 2007.
4. Terzaghi .K and Peck .R.B, “Soil Mechanics in Engineering Practice”, JohnWiley Ltd., 1996.
5. Arora .K.R, “Soil Mechanics and Foundation Engineering”, Standard Publication Distributors, 2011.

Online source:

https://nptel.ac.in/courses/105/101/105101201/#

https://www.kopykitab.com/GATE-Study-Material-Geotechnical-Engineering-Civil-Engineering-by-Panel-Of-Experts

https://civilenggforall.com/soil-mechanics-and-foundations-textbook-by-civilenggforall-free-download-pdf/

1902CE403	TRANSPORTATION ENGINEERING	L	T	P	C
		3	0	0	3

UNIT I	HIGHWAY PLANNING AND GEOMETRIC DESIGN	9 Hours

Importance Road transportation, Highway alignment, Engineering surveys for highway location. Geometric design – Cross section element, width, camber, design – speed, sight distances, requirements and design of horizontal and vertical alignments.

UNIT II	HIGHWAY MATERIALS	9 Hours

Highway materials – Soil, Stone aggregates, Bituminous Binders, Bituminous paving mixes, Portland cement and cement concrete.

UNIT III	TRAFFIC MANAGEMENT AND CONTROL	9 Hours

Traffic characteristics; Road user and vehicular characteristics, Traffic Engineering studies and Analysis: Traffic volume studies, Traffic Regulation and control: Traffic regulations, traffic control devices, traffic signs and signals. Design ofroad Intersection: Intersections at grade, Un-channelized intersections, Channelized intersections and rotaryintersections.

UNIT IV	PAVEMENT DESIGN	9 Hours

Flexible Pavements- components and their functions, Factors affecting design and performance, design methods. Rigid Pavements- components and their functions, Factors affecting design andperformance, design methods.

UNIT V	CONSTRUCTION AND MAINTENANCE	9 Hours

Construction: Embankment and subgrade, Excavation of earth, Construction of flexible pavements, cement concrete pavements. Maintenance: Important of highway maintenance works, Deterioration and damages in road Infrastructure, Maintenance in flexible pavements and maintenance measures.

	Total:	45 Hours

REFERENCES:

1. Veeraragavan. A, Khanna. S.K., Ceg Justo, Highway Engineering, Nem Chand & Brothers, 2014.
2. Sharma, S.K. “Principles Practice and Design of Highway Engineering ”, S. Chand & Co Ltd, 2013.
3. Gupta B.L and Amith Gupta, Highway and Bridge Engg., Standard publishers, and Distributor, 2010.
4. ParthaChakroborthy and Animesh Das, Principles of Transportation Engineering, Prentice Hall of India Pvt. Ltd., 2013.
5. LrKadiyali, LrKadyali, NbLal ,“Principles And Practice Of Highway Engineering ”, Khanna Publishers. 2013.
6. Rangwala.S.C, Highway Engineering, Charotar Book Distributors, 2013.

Online reference/website may be added

1.https://nptel.ac.in/courses/105/101/105101087/

2.https://nptel.ac.in/courses/105/105/105105107/

3.http://www.nptelvideos.in/2012/11/introduction-to-transportation.html

1902CE404	CONCRETE TECHNOLOGY	L	T	P	C
		3	0	0	3

UNIT I	CONSTITUENT MATERIALS	9 Hours

Cement-Different types-Chemical composition and Properties - Tests on cement-IS Specifications-Aggregates- Classification-Mechanical properties and tests as per BIS Grading requirements- Water- Quality of water for use in concrete.

UNIT II	CHEMICAL AND MINERAL ADMIXTURES	9 Hours

Accelerators-Retarders- Plasticisers- Super plasticizers- Water proofers - Mineral Admixtures like Fly Ash, Silica Fume, Ground Granulated Blast Furnace Slag and Metakaoline -Their effects on concrete properties

UNIT III	PROPORTIONING OF CONCRETE MIX	9 Hours

Principles of Mix Proportioning-Properties of concrete related to Mix Design-Physical properties of materials required for Mix Design - Design Mix and Nominal Mix-BIS Method of Mix Design - Mix Design Examples

UNIT IV	FRESH AND HARDENED PROPERTIES OF CONCRETE	9 Hours

Workability-Tests for workability of concrete-Slump Test and Compacting factor Test-Segregation and Bleeding-Determination of Compressive and Flexural strength as per BIS - Properties of Hardened concrete- - Stress-strain curve for concrete-Determination of Young‟s Modulus

UNIT V	SPECIAL CONCRETES	9Hours

Light weight concretes - High strength concrete - Fibre reinforced concrete – Ferro cement - Ready mix concrete - SIFCON-Shotcrete – Polymer concrete - High performance concrete- Geopolymer Concrete.

	Total:	45 Hours

REFERENCES:

1. Santhakumar,A.R; "Concrete Technology" , Oxford University Press, New Delhi, 2007.
2. Neville, A.M; "Properties of Concrete", Pitman Publishing Limited, London, 1995.
3. Gambir, M.L; "Concrete Technology", 3rdEdition, Tata McGraw Hill Publishing Co Ltd,

Online reference/website may be added

1.https://nptel.ac.in/courses/105/102/105102012/
2.https://nptel.ac.in/courses/105/104/105104030/
3.https://nptel.ac.in/courses/105/106/105106176/

1902CE405	BIOLOGYFORENGINEERS	L	T	P	C
	(For B.E. Civil Engineering)	3	0	0	3

UNIT I	LIFE (INTRODUCTION TO CELLS)	8 Hours

Biomolecules: Carbohydrates, Proteins, Nucleic Acids, Lipids, Enzymes. Cell structure and composition; The central dogma in molecular biology; Darwinian evolution; Molecular perspective and classification; Phylogenetic trees; Study of inter-and intra-species relationships; Microorganisms and Infectious Diseases.

UNIT II	LIFE PROCESSES (FUNCTIONING OF HUMAN SYSTEMS)	7 Hours

Muscular System; Nervous System; Special Senses; Sensory organs (eye, ear, smell, taste, touch); Cardiovascular System; Respiratory System; Renal System; Immune System; Endocrine System; Cancer and Life style diseases; Stem cells.

UNIT III	ENVIRONMENTAL ENGINEERING APPLICATIONS:	10 Hours

Waste water management- Phytoremediation technique- Root zone system - Treated lagoon anaerobic and aerobic condition) - Constructed wetland technique. Solid waste management - Composting methods. Air pollution -Effect of air pollution on human health and other living things- treating by biomaterials.

UNIT IV	CONCRETE TECHNOLOGYAPPLICATIONS	10 Hours

Self healing concrete, Use of bacteria to increase the strength of concrete. Autonomous Healing – need, how does bioconcrete works? – Finding right bacteria- interest from industry- full scale testing – limitations. Bioconcrete mark II

UNIT V	RESTORATION OF SOIL	10 Hours

Restoration of soil by biological means. biological soil treatments – Bio venting – Biodegradation- Bio sparging- Bio augmentation- Composting- Land farming – Bio piles – Bioreactors. Phytoremediation – Restoration by means of vegetation – based upon the ability of vegetation to absorb toxins. Micro remediation – restoration using mushrooms Based on the ability of mushrooms to exude enzymes which cause the breakdown of the
contaminants

Total: 45 Hours

REFERENCE BOOKS

1. BiologyforEngineers,RajivSingal,CBSPublishersandDistributorsPvtLtd;FirstEditionedition(4 June 2019).
2. Biology for Engineers, Wiley Editorial, Wiley (2018).
3. Environmental Biology, Matthew R. Fisher, Open Oregon Educational Resources, 2018.
4. Self-healing Concrete, Michelle M. Pelletier, University of Rhode Island, 2010.
5. Biological Approaches to Sustainable Soil Systems, Norman Uphoff et al., CRC Press; 1 edition (March 3, 2006)
6. https://nptel.ac.in/courses/121/106/121106008/
7. https://nptel.ac.in/noc/courses/noc18/SEM2/noc18-bt23/

1902CE451	COMPUTER AIDED BUILDING AND DRAWING LAB	L	T	P	C
		0	0	2	1

LIST OF EXPERIMENTS:

1. Functional planning – Introduction to anthropometrics and ergonomics – Occupancy classificationof
2. Buildings –Essentials of National Building Code – Essentials of Building and development rules–
3. Introduction to greenbuilding.
4. Building Physics : Sun's movement and building: Sun control devices –Exposed walls and Openings
5. Lighting and acoustics
6. Introduction to AutoCAD – Draw and modify tools- Dimensioning-Layers- Blocks-Printing- Two dimensional
7. drawing 3D commands
8. Door, Windows, Ventilators.
9. Foundation, Staircase
10. Residential buildings – Plan, Section, Elevations
11. Public buildings like office, dispensary, post office, bank etc
12. Industrial buildings

Total: 30 Hours

ADDITIONAL EXPERIMENTS:

1. Commercial building like sky scrapers
2. Domed structures

REFERENCES:

1. Sikka V. B., A Course in Civil Engineering Drawing, 4th Edition, S.K. Kataria and Sons, 1998.
2. George Omura, "Mastering in AUTOCAD 2002", BPB Publications, 2002
3. Verma.B.P., "Civil Engineering Drawing and House Planning", Khanna Publishers, 1989.
4. A Guide to building information modeling for Owners, Managers, Designers, Engineers, and Contractors, John Wiley and Sons. Inc., 2008.
5. Marimuthu V.M., Murugesan R. and Padmini S., "Civil Engineering Drawing-I", Pratheeba Publishers, 2008.
6. Computer Aided Building and Drawing Lab Manual – N.Karthika, AP/Civil, EGSPEC

1902CE452	SOIL MECHANICS LAB	L	T	P	C
		0	0	2	1

LIST OF EXPERIMENTS:

1. Determination of watercontent
2. Determination of specificgravity
3. Determination of grain size distribution of SieveAnalysis
4. Determination of grain size byHydrometer
5. Determination of Liquid limit and Plastic of thesoil
6. Determination of Shrinkage limit of thesoil
7. Determination of Dry density by Standard Proctor Compactiontest
8. Determination of Field density by Core cuttermethod
9. Determination of Field density by Sand Replacementmethod
10. Determination of Permeability Coefficient using Constant head method
11. Determination of Permeability Coefficient using Variable head method
12. Determination of shear strength by using Direct Shear test
13. Determination of compression strength by using Unconfined compressive strength test

ADDITIONAL EXPERIMENTS:

1. Consolidation Test
2. Triaxial Test

REFERENCES:

1. Murthy, V.N.S., “Soil Mechanics and Foundation Engineering”, CBS Publishers Distribution Ltd., New Delhi. 2007.
2. GopalRanjan and Rao A.S.R. “Basic and Applied soil mechanics”, Wiley Eastern Ltd, New Delhi (India), 2000.
3. AroraK.R.,“Soil Mechanics and Foundation Engineering”, Standard Publishers and Distributors, New Delhi, 2002.
4.“Soil Engineering Laboratory Instruction Manual” published by Engineering College Co- operative Society, Anna University, Chennai, 1996.
5. Saibaba Reddy, E. Ramasastri, K. “Measurement of Engineering Properties of Soils”, New age International (P) Limited Publishers, New Delhi, 2002.
6. Lambe T.W., “Soil Testing for Engineers”, John Wiley and Sons, New York, 1990.
7. Soil Mechanics Lab Manual – N.R.Vethamoorthy, AP/Civil, EGSPEC

1904GE451	LIFE SKILLS: VERBAL ABILITY	L	T	P	C
		2	0	0	1

MODULE I	VOCABULARY USAGE	6 Hours

Introduction - Synonyms and Antonyms based on Technical terms – Single word Substitution – Newspaper, Audio and video listening activity.

MODULE II	COMPREHENSION ABILITY	6 Hours

Skimming and Scanning – Social Science passages – Business and Economics passages – latest political and current event based passages – Theme detection – Deriving conclusion from passages.

MODULE III	BASIC GRAMMAR AND ERROR DETECTION	6 Hours

Parallelism – Redundancy – Ambiguity – Concord - Common Errors – Spotting Errors – Sentence improvement – Error Detection FAQ in Competitive exams.

MODULE IV	REARRANGEMENT AND GENERAL USAGE	6 Hours

Jumble Sentences – Cloze Test - Idioms and Phrases – Active and passive voice – Spelling test.

MODULE V	APPLICATION OF VERBAL ABILITY	6 Hours

Business Writing - Business Vocabulary - Delivering Good / Bad News - Media Communication - Email Etiquette – Report Writing - Proposal writing – Essay writing– Indexing –Market surveying.

TOTAL: 30 HOURS

REFERENCES:

1. Arun Sharma and MeenakshiUpadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition2017
2. R S Aggarwal and VikasAggarwal , Quick Learning Objective General English ,S.Chand Publishing House, 2017
3. Dr.K.Alex , Soft Skills, S.Chand Publishing House, Third Revise Edition,2014
4. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition, 2007.
5. https://nptel.ac.in/courses/109/107/109107155/
6. https://nptel.ac.in/courses/109/105/109105144/

1901MCX02		CONSTITUTION OF INDIA	L	T	P	C
			3	0	0	0

UNIT I	EVOLUTION OF THE INDIAN CONSTITUTION	9 Hours

1909 Act, 1919 Act and 1935 Act. Constituent Assembly: Composition and Functions; Fundamental features of the Indian Constitution.

UNIT II	UNION , STATE AND LOCAL GOVERNMENT	9 Hours

Union Government: Executive-President, Prime Minister, Council of Minister
State Government: Executive: Governor, Chief Minister, Council of Minister
Local Government: Panchayat Raj Institutions, Urban Government

UNIT III	RIGHTS AND DUTIES:	9 Hours

Fundamental Rights, Directive principles, Fundamental Duties

UNIT IV	F RELATION BETWEEN FEDERAL AND PROVINCIAL UNITS:	9 Hours

Union-State relations, Administrative, legislative and Financial, Inter State council, NITI Ayog, Finance Commission of India

UNIT V	STATUTORY INSTITUTIONS:	9 Hours

Elections-Election Commission of India, National Human Rights Commission, National Commission for Women

	Total:	45 Hours

REFERENCES:

1. D.D. Basu, Introduction to the constitution of India, Lexis Nexis, NewDelhi.
2. SubhashKashyap, Our Parliament, National Book Trust, NewDelhi.
3. PeuGhosh, Indian Government &Politics, Prentice Hall of India, NewDelhi.
4. B.Z. Fadia&KuldeepFadia, Indian Government &Politics, Lexis Nexis, NewDelhi.

ONLINE SOURCES:

5. https://byjus.com/free-ias-prep/constitution-of-india-an-overview/
6. https://nptel.ac.in/courses/129/106/129106002/