The following are the syllabus copy as per Anna University curriculum and experiential learning document

1.3.2
COURSES THAT INCLUDE EXPERIENTIAL LEARNING THROUGH PROJECT WORK/FIELD WORK/INTERNSHIP DURING 2022-2023

1.3.2 AVERAGE PERCENTAGE OF COURSES THAT INCLUDE EXPERIENTIAL LEARNING THROUGH PROJECT WORK / FIELD WORK / INTERNSHIP DURING 2022-2023

S.NO	PROGRAME OFFERING	NAME OF THE COURSE	COURSE CODE	PROJECT WORK / FIELD WORK / INTERNSHIP	PAGE NO
1	M.E-Structural Engg	Earthquake Analysis and Design of Structures	ST5301	Internship	3
2	M.E-Structural Engg	Practical Training III (2 Weeks)	ST5411	Training Report	5
3	M.E-Structural Engg	Practical Training II (2 Weeks)	ST5311	Project work	10
4	M.E-Structural Engg	Project Work (Phase I)	ST5313	Project work	15

ST5301 EARTHQUAKE ANALYSIS AND DESIGN OF STRUCTURES **L T P C**
3 0 0 3

OBJECTIVE:

- To study the effect of earthquakes, analysis and design of earthquake resistant Structures.

UNIT I EARTHQUAKE GROUND MOTION **9**

Engineering Seismology (Definitions, Introduction to Seismic hazard, Earthquake Phenomenon), Seismotectonics and Seismic Zoning of India, Earthquake Monitoring and Seismic Instrumentation, Characteristics of Strong Earthquake Motion, Estimation of Earthquake Parameters, Microzonation.

UNIT II EFFECTS OF EARTHQUAKE ON STRUCTURES **9**

Dynamics of Structures SDOFS MDOFS - Response Spectra - Evaluation of Earthquake Forcesas per codal provisions - Effect of Earthquake on Different Types of Structures - Lessons Learnt From Past Earthquakes

UNIT III EARTHQUAKE RESISTANT DESIGN OF MASONRY STRUCTURES **9**

Structural Systems - Types of Buildings - Causes of damage - Planning Considerations - Philosophy and Principle of Earthquake Resistant Design - Guidelines for Earthquake Resistant Design - Earthquake Resistant Masonry Buildings - Design consideration – Guidelines.

UNIT IV EARTHQUAKE RESISTANT DESIGN OF RC STRUCTURES **9**

Earthquake Resistant Design of R.C.C. Buildings - Material properties - Lateral load analysis – Capacity based Design and detailing – Rigid Frames – Shear walls.

UNIT V VIBRATION CONTROL TECHNIQUES **9**

Vibration Control - Tuned Mass Dampers – Principles and application, Basic Concept of Seismic Base Isolation – various Systems- Case Studies, Important structures.

TOTAL: 45 PERIODS

OUTCOME:

- At the end of this course the students will be able to understand the causes and effect ofearthquake.
- They will be able to design masonry and RC structures to the earthquake forces as per therecommendations of IS codes of practice.

REFERENCES:

1. Brebbia C. A.,"Earthquake Resistant Engineering Structures VIII",WIT Press, 2011
2. Bruce A Bolt, "Earthquakes" W H Freeman and Company, New York, 2004.
3. Duggal S K , "Earthquake Resistant Design of Structures", Oxford University Press, 2007.
4. Mohiuddin Ali Khan "Earthquake-Resistant Structures: Design, Build and Retrofit", ElsevierScience & Technology, 2012
5. Pankaj Agarwal and Manish Shrikhande, "Earthquake Resistant Design of Structures",Prentice Hall of India, 2009.
6. Paulay,T and Priestley, M.J.N., "Seismic Design of Reinforced Concrete and Masonrybuildings", John Wiley and Sons, 1992.

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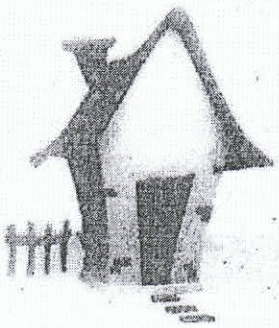

Sona Builders
Engineers & Contractors

Er. P. Senthilkumar

Date: 13.08.2022

TO WHOM IT MAY CONCERN

This is to certify that **Ms. T. Bavithra (920822413001),** M.E. Structural Engineering, NPR College of Engineering & Technology, Natham has successfully completed her intership during the period of 13.07.2022 to 13.08.2022.

For Sona Builders Engineers & Contractors

Er. P. Senthilkumar
Proprietor

Dr. J.SUNDARARAJAN,
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Tin No.33675340834

ST5411	PRACTICAL TRAINING III (2 Weeks)	L T PC
		0 0 0 1

OBJECTIVE:

- To train the students in the field work so as to have a firsthand knowledge of practicalproblems related to Structural Engineering in carrying out engineering tasks.
- To develop skills in facing and solving the field problems.

SYLLABUS:

The students individually undertake training in reputed Industries during the summer vacation for aspecified period of two weeks. At the end of training, a detailed report on the work done should be submitted within ten days from the commencement of the semester. The students will be evaluated through a viva-voce examination by a team of internal staff.

OUTCOME:

- They are trained in tackling a practical field/industry orientated problem related to StructuralEngineering.

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CONSTRUCTION OF AN INDIVIDUAL RESIDENTIAL BUILDING

A TRAINING REPORT

Submitted by

JEYA DHARANI J (920821413001)

in partial fulfillment for the award of the degree of

MASTER OF ENGINEERING

IN

STRUCTURAL ENGINEERING

NPR COLLEGE OF ENGINEERING AND TECHNOLOGY,

NATHAM, DINDIGUL -624 401

ANNA UNIVERSITY: CHENNAI 600 025

MARCH 2023

ANNA UNIVERSITY : CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this Report titled **"CONSTRUCTION OF AN INDIVIDUAL RESIDENTIAL BUILDING"** is the bonafide work of **JEYA DHARANI J (920821413001)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE
DR.A.HEMALATHA, M.TECH,Ph.D
HEAD OF THE DEPARTMENT
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SIGNATURE 22/3/23
Mr.C.VIJAYAKUMAR,M.E.,
SUPERVISOR(AP/CIVIL)
Department of Civil Engineering,
NPR College of Engineering &
Technology, Natham.

Submitted for the project viva voce examination held on 31-3-2023

NPR COLLEGE OF ENGG & TECHNOLOGY NATHAM

21/3/23
Internal Examiner

31.3.23
External Examiner

Dr. J.SUNDARARAJAN, B.E., M.Tech., Ph.D.,
Principal
NPR College of Engineering & Technology
Natham, Dindigul (Dt) - 624 401

ABSTRACT

Structural planning and design is an art and science of designing with economy, elegance, serviceable and durable structure. The entire process of structural planning and designing requires not only imagination and conceptual thinking but also sound knowledge of science of structural engineering besides knowledge of practical aspects, such as relevant design codes and byelaws backed up by example experience.The functional requirements and aspects of aesthetics are looked into normally be the architect while the aspect of the safety, serviceability, durability and economy of the structure are attended by structural designer.For this purpose a site is selected in which the building consists of all the rooms required for a residential house like bedroom, toilet, living, kitchen/dinning and Pooja room .The Building is to be constructing in Madurai.The plinth area of the building is Sq.feet.1320, M20 grade concrete and Fe500 grade steel is used.

CHAPTER 5

CONCLUSION

5.1 SCOPE OF THIS TRAINING

An internship is an opportunity for a us to experience professional development under an actual working environment. The Scope of Work is to provide real work experiences with opportunities to explore our interests and develop professional skills and competencies.

5.2 EXPERIENCES

- Professional communications
- Teamwork
- Problem Solving Skills
- Work Ethics
- Adaptability Skills
- Communication Skills
- Responsibility
- Time Management

5.3 CONCLUSION

I would like to say that this training is an excellent opportunity for me to get the ground level and experience the things that we would have never gained through going straight into a job. I am grateful to the NPR COLLEGE OF ENGINEERING AND TECHNOLOGY and the OMEGA CONSTRUCTIONS for giving this wonderful opportunity. This training is to provide an opportunity to identify, observe and practice how engineering is applicable in real industry. It is not only to get experience on technical practices but also to observe management practices and to interact with the field workers.

ST5311	PRACTICAL TRAINING II (2 Weeks)	L T PC 0 0 0 1

OBJECTIVE:

- To train the students in the field work so as to have a firsthand knowledge of practicalproblems related to Structural Engineering in carrying out engineering tasks.
- To develop skills in facing and solving the field problems.

SYLLABUS:

The students individually undertake training in reputed Industries during the summer vacation for aspecified period of two weeks. At the end of training, a detailed report on the work done should be submitted within ten days from the commencement of the semester. The students will be evaluated through a viva-voce examination by a team of internal staff.

OUTCOME:

- They are trained in tackling a practical field/industry orientated problem related to StructuralEngineering.

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Principal
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STUDY ON POND ASH AS A PARTIAL REPLACEMENT OF FINE AGGREGATE IN GGBS BASED CONCRETE

A THESIS

Submitted by

JEYA DHARANI J (920821413001)

in partial fulfillment for the award of the degree of

MASTER OF ENGINEERING

IN

STRUCTURAL ENGINEERING

NPR COLLEGE OF ENGINEERING AND TECHNOLOGY,

NATHAM, DINDIGUL -624 401

ANNA UNIVERSITY: CHENNAI 600 025

MARCH 2023

ANNA UNIVERSITY : CHENNAI 600 025

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SIGNATURE

DR.A.HEMALATHA, M.TECH, Ph.D

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Internal Examiner 01/04/2023

COLLEGE OF ENGG. & TECHNOLOGY * NPR NATHAM

External Examiner 01.04.2023.

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Principal
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ABSTRACT

Concrete is the most widely used construction material in India with annual consumption exceeding 100 million cubic metres. It is well known that conventional concrete designed on the basis of compressive strength does not meet many functional requirements such as impermeability, resistance to frost etc.

The production of the Portland cement as a main constituent of concrete has basically led to the dangerous impacts on our environment by releasing substantive amount of CO_2. Production of one ton of Portland cement emits one ton of CO_2 and other greenhouse gases. Hence the cement must be effectively replaced by some other cementitious materials without compromising the desired properties of concrete.The coal based power plant generates a huge amount of fly ash which is collected from electrostatic precipitator and the bottom ashes are disposed in a slurry form in large ponds and dykes. Pond Ash requires huge area, water and energy to dispose off, so recycling of the pond ash is indeed required.

The purpose of this study is to find the suitability of GGBS as a replacement material for cement and pond ash as a replacement material for fine aggregate without compromising the strength & durability of conventional concrete. Replacement of cement partially by GGBS also reduces the supply demand on cement and may also reduce the emission of CO_2 into atmosphere. The physical and chemical properties of GGBS and pond ash has been studied and both the industrial wastes are used to replace the cement and fine aggregate up to 40% and 20% respectively in concrete. The specimens were tested for its mechanical properties such as compressive strength, split tensile strength on 7, 28, 56 days.

After determining the properties of the concrete mixes, the optimum percentage of replacement levels of GGBS and pond ash were found out for all the concrete Mixes. It is found that replacement of cement by 30 % of GGBS and fine aggregate by 20 % of pond ash gives optimum results in the compressive strength, split tensile strength tests.

7.3 CONCLUSIONS

This research is focused on comparative study of using GGBS and Pond Ash to produce Eco-friendly concrete. The significant conclusions drawn from the study are given below.

- As the percentage of replacement of pond ash increases, the weight of the specimens reduced due to low density of pond ash.
- It is noticed that there is reduction of compressive strength of concrete mixes at 14 and 28 days of curing. At 56 days, the compressive strength of the mixes gets improved.
- The value of split tensile strength of optimized mix also increases at 28days testing due to addition of pond ash and GGBS.

The workability and mechanical properties of concrete had been tested and evaluated.The durability and flexural properties of concrete will be tested in phase 2 of the project.

ST5313	PROJECT WORK (PHASE I)	L T P C 0 0 12 6

OBJECTIVE:

- To identify a specific problem for the current need of the society and collecting informationrelated to the same through detailed review of literature.
- To develop the methodology to solve the identified problem.
- To train the students in preparing project reports and to face reviews and viva-voceexamination.

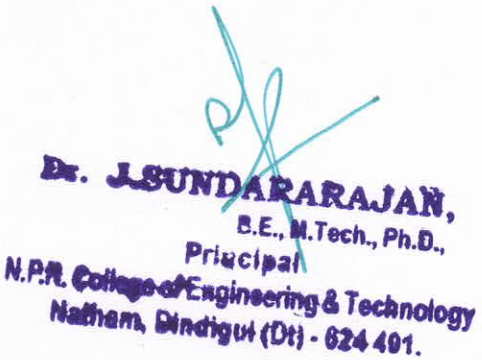
SYLLABUS:

The student individually works on a specific topic approved by faculty member who is familiar in this area of interest. The student can select any topic which is relevant to his/her specialization of the programme. The topic may be experimental or analytical or case studies. At the end of the semester, a detailed report on the work done should be submitted which contains clear definitionof the identified problem, detailed literature review related to the area of work and methodology for carrying out the work. The students will be evaluated through a viva-voce examination by a panel of examiners including one external examiner.

TOTAL: 180 PERIODS

OUTCOME:

- At the end of the course the students will have a clear idea of his/her area of work and theyare in a position to carry out the remaining phase II work in a systematic way.



STUDY ON POND ASH AS A PARTIAL REPLACEMENT OF FINE AGGREGATE IN GGBS BASED CONCRETE

A THESIS

Submitted by

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in partial fulfillment for the award of the degree of

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OCTOBER 2023

ANNA UNIVERSITY : CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this Thesis titled **"STUDY ON POND ASH AS A PARTIAL REPLACEMENT OF FINE AGGREGATE IN GGBS BASED CONCRETE"** is the bonafide work of **JEYA DHARANI J (920821413001)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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Submitted for the project viva voce examination held on 9.10.2023

INTERNAL EXAMINER

EXTERNAL EXAMINER

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The purpose of this study is to find the suitability of GGBS as a replacement material for cement and pond ash as a replacement material for fine aggregate without compromising the strength & durability of conventional concrete. Replacement of cement partially by GGBS also reduces the supply demand on cement and may also reduce the emission of CO_2 into atmosphere. The physical and chemical properties of GGBS and pond ash has been studied and both the industrial wastes are used to replace the cement and fine aggregate up to 40% and 20% respectively in concrete. The specimens were tested for its mechanical properties such as compressive strength, split tensile strength and flexural strength on 7, 28, 56 days and durability properties like water permeability and chloride permeability.

After determining the properties of the concrete mixes, the optimum percentage of replacement levels of GGBS and pond ash were found out and PCC Beams were casted to determine the flexural strength for all the concrete Mixes. It is found that replacement of cement by 30 % of GGBS and fine aggregate by 20 % of pond ash gives optimum results in the compressive strength, split tensile strength and flexural strength tests.

CHAPTER 8

CONCLUSION

8.1 CONCLUSIONS

This research is focused on comparative study of using GGBS and Pond Ash to produce Eco-friendly concrete. The significant conclusions drawn from the study are given below.

- As the percentage of replacement of pond ash increases, the weight of the specimens reduced due to low density of pond ash.
- It is noticed that there is reduction of compressive strength of concrete mixes at 14 and 28 days of curing. At 56 days, the compressive strength of the mixes gets improved.
- The value of split tensile strength and flexural strength of optimized mix also increases at 28days testing due to addition of pond ash and GGBS.
- The durability of optimized concrete mix under HCl, H_2SO_4 and $MgSO_4$ solution performed better than the control concrete.
- Replacement of cement by 30 % of GGBS and fine aggregate by 20 % of pond ash gives optimum results in the compressive strength, split tensile strength and flexural strength tests.