



Growing Capacity in Assam

Subject Design for new
Master of Construction
Management Course

Assam Engineering College
Guwahati, Assam, India





Cross-cultural Analysis and capacity building in construction management practices focusing on housing and infrastructure sectors in Assam and Australia - Version 1/ 17 May 2016

Academic Visitors' Report

Design of the subjects for new Construction
Management course at AEC

Visitors

Dr Purobi Patowary

Dr Manjuri Hazarika

Duration

29 April – 16 June 2019

Annexure II



Growing Capacity in Assam

Construction Management Course (AEC)

Course Structure			
<i>Specilisation 1</i>	<i>Specilisation 2</i>	<i>Specilisation 3</i>	<i>Specilisation 4</i>
Sustainability Management	Cost Management	Project Management	Building Construction & Technology
Common Core Subjects			
Introduction to sustainability	Building Services and operations (SB)	Fundamentals of project management (PB)	Construction Materials (BT)
Specialisation Core Subjects			
Sustainable Solutions for Building (SB)	Building Regulations (JP)	Contract Management (JP)	Construction Law
Sustainable Materials and Performance	Construction Law	Project procurements	Building Construction (BT)
Construction Waste Management (PB)	Construction Methods and Equipment (SB+PB)	Project Monitoring and Control	Construction Methods and Equipment
Open Elective	Open Elective	Open Elective	Open Elective
Elective Subjects			
Construction Safety (MH)	Cost planning and budgeting	Project Finance and Economics (SKD)	Building regulations
Environmental Risks and Impacts Assessments	Measurement and Estimation	Construction Planning	Construction Methods and Equipment
Social Procurement (PP)	Cost monitoring and control	Project Risks and quality management (SKD)	3R in Construction (BT+ JP)
Building regulations	Project procurements (SKD)	TBA	TBA
Research Project	Research Project	Research Project	Research Project

SB – Sasanka Bora
 PB – Pradip Baishya
 JP – Jayanta Pathak
 BT – Bipul Talukdar
 SKD – Sudip Kumar Deb
 MH – Manjuri Hazarika
 PP – Purobi Patowary



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MASTER OF CONSTRUCTION MANAGEMENT
ASSAM ENGINEERING COLLEGE
GUWAHATI-781013

SOCIAL PROCUREMENT

(SUBJECT GUIDE)

(Version-1.0)

Developed by –DR. PUROBI PATOWARY



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1.0 INTRODUCTION

Social procurement is essentially buying contracts for goods and services from social enterprises, with the intention of making a positive social impact on job creation for a historically disadvantaged community, or reducing carbon emissions. In simpler terms, it means using the government's purchasing power to generate *social benefits*, particularly employment in economically or socially backward areas. The term *social benefit* implies the following:

- ✚ Promoting more diverse and inclusive workforces.
- ✚ Creating training and employment opportunities.
- ✚ Addressing complex local challenges, such as intergenerational unemployment, crime, vandalism and economic decline in local communities.
- ✚ Encouraging local economic development and growth.
- ✚ Helping people to participate in the community and the economy.
- ✚ Engaging small-to-medium enterprises and social benefit suppliers, providing them with the same opportunities as other businesses.

The subject will be a readymade package of information and guidelines to government agencies, buyers, contractors & suppliers to create job and employment opportunities through smarter procurement processes. When assessing value for money, it is important that the best outcomes for the community are also considered, besides price and other non-cost factors, such as service and quality. Thus social procurement practices provide opportunities to consider economic, environmental and social objectives as part of a broader context of value for money. Social Procurement is gaining interest from institutions, social enterprises and organizations with social responsibility obligations because it provides an opportunity to generate greater value through the procurement process.

2.0 OVERVIEW & OBJECTIVES OF THE SUBJECT

The subject mainly covers fundamentals of Social Procurement framework, policies and guidelines to buyers, enterprises and suppliers, relevant under the proposed construction management course. The readers and students will be introduced to the concepts of social responsibility and sustainable growth, green & sustainable



procurement and how these can be achieved in the practical field. Topics covered include: terminology & brief history of social procurement, the social procurement framework, its scope & purpose, procurement activities, guidelines for buyers, contract managers & suppliers, legal considerations, planning, implementing, reporting, managing & evaluation processes. Also students will be exposed to existing frameworks in different parts of the world so that they can analyse the policies, objectives & outcomes of sustainable social procurement on the economic & social health of their countries.

3.0 LEARNING OUTCOMES

This subject will develop the following program learning outcomes.

On successful completion, students should be able to:

- To understand the importance of social procurement as a concept that can be part of everyday procurement by local government.
- To recognise that tangible policy outcomes are possible in areas such as local economic development, employment and training for disadvantaged groups.
- To appreciate that social objectives can become a part of mainstream procurement practices and organisational approaches, in the same way as occupational health and safety and environmental management are business as usual practices for all levels of government today.
- To develop analytical and problem-solving skills in relation to managing conflict, risk and legal considerations involved in procurement practices.
- To facilitate decision-making when faced with issues arising from factors such as different organizational structures for public sector services, different regulatory, legislative and funding arrangements, and different cultures.

4.0 GENERIC SKILLS

On completion of the subject students should have developed the following skills and capabilities:



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- Ability to appreciate the scope and dimensions of professional roles.
- Ability to function effectively as either a team leader or member within multi-disciplinary and multi-cultural teams.
- Ability to communicate ideas, concepts and solutions to both technical and non-technical audiences effectively, clearly and concisely.
- Ability to handle several tools that helps to formulate innovative hybrid tool for the planner and manager.
- Ability to carry out research and apply fundamental theoretical knowledge to problem solving in relevant disciplines.

5.0 DETAILED SUBJECT SCHEDULE

Total contact period: 45hours

Duration of Lecture: 1 Hour

Duration of Tutorial/Group Discussion: 1.5 Hour

Table 1: Detailed Subject Schedule

SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
1	Lecture 1: Introduction to Social Procurement (SP)	• Definition & necessity of SP • Social value (social benefit) • Procurement & its strategic context • Objectives & outcomes • SP vs. Traditional approaches • Benefits of SP • Key focus areas of SP • How to achieve SP	Reading list: • SP- Ref 1-Sec. 1, 2 • SP- Ref 2- Ch. 1, 2 (Essential)
	Lecture 2: SP & its Implications for Social Enterprise	• Definition of social enterprise • SP- Brief history • Changing context for public procurement • SP in contemporary public policy • Direct & indirect SP • SP Insights- Policy to Practice	



SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
	Tutorial 1:	Practical Examples and Reflections (Lecture 1 & 2)	Discussions/quiz etc. based on the contents of Essential Readings of Lecture 1 & 2.
2	Lecture 3: SP strategies & practices in different countries	• Procurement policy-Public vs. Transactional • SP as a lever of economic, technological & social reform • Factors affecting SP strategies in different countries • Pitfalls of the strategies • Need for more integration into govt. policy & reforms	Reading list: • SP- Ref 5 • SP- Ref 6 (Essential) • SP- Ref 7 • SP- Ref 8 (Essential)
	Lecture 4: Designing a Public Procurement Policy	• Review & analysis of some existing frameworks- Case studies • Closed loop model for analysis • Actions, Trends & Issues • Relationships between Allocative and Structural Policies	
	Tutorial 2:	Practical Examples and Reflections (Lecture 3& 4)	Discussions/quiz etc. based on the case studies contents of Lecture 3 & 4.
3	Lecture 5: Organizational approach to SP	• Building support • Procurement Policy & Process • Planning & Strategy • Opportunity Analysis • Implementing SP in a project lifecycle • Steps- ✓ <i>Procurement Project Planning</i> ✓ <i>Tendering, Assessment & Selection</i> ✓ <i>Managing Supply Arrangements</i> ✓ <i>Evaluation & Learning</i>	Reading list: • SP- Ref 2- Ch. 4 • SP- Ref 3- Ch. 4 (Essential)



SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
	Lecture 6: Legal considerations of SP	• Tendering & Contracting aspects • Samples of integrating SP into tenders & contracts • Case studies 1. <i>A focus on Aboriginal owned businesses</i> 2. <i>Integrating SP across business units</i> 3. <i>Creating employment opportunities for people with a disability</i> 4. <i>Local economic development strategy</i>	• SP- Ref 2- Ch. 5, 7 • SP- Ref 9 – <i>Case studies</i> pp. 6, 10, 14, 18 (Essential)
	Tutorial 3:	Practical Examples and Reflections (Lecture 5& 6)	Discussions/quiz etc. based on the contents of Essential Readings of Lecture 5 & 6.
4	Lecture 7: Role of SP in promoting innovation & social values	• The meaning & limitations of SP for innovation • Building capability for SP of innovation • Risk management in SP of innovation • Forward commitment procurement and its effect on perceived risks in PPI projects • Case studies	Reading list: • SP- Ref 3- Ch. 5 • SP- Ref 10 (Essential) • SP- Ref 11 • SP- Ref 12 (Optional)
	Lecture 8: Barriers & Challenges	• Demand side barriers ✓ <i>Cultural barriers</i> ✓ <i>Integration of social values into govt. regulations</i> ✓ <i>Inadequate tools for evaluation</i> • Supply side barriers ✓ <i>Lack of Experience of the SP Process</i> ✓ <i>Limited Capacity to evaluate social value</i> • Barrier Framework • Enablers of SP • Case studies	



SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
	Tutorial 4:	Practical Examples and Reflections (Lecture 7& 8)	Discussions/quiz etc. based on the contents of Essential Readings of Lecture 7& 8.
	Assignment 1:	Analysis of Social Procurement issues, barriers & challenges in different public sector services due to different regulatory, legislative and funding arrangements, and different cultures. (Draft Report to be Submitted)	
5	Lecture 9: Evolution of SP in Australia	• Context of SP in Australia • Incorporating social benefits into procurement practices • Forces driving SP • Methodology to design the SP framework • SP process & practice • Analysis of barriers & challenges in public, private & non-profit sectors	Reading list: • SP- Ref 17 (Essential) • SP- Ref 18 (Essential)
	Lecture 10: Corporate SP in Australia	• Case studies from the corporate world on ✓ <i>Community Engagement</i> ✓ <i>Supported Workforce Program</i> ✓ <i>Collaborative Supply Chain Model</i> ✓ <i>Local Business Partnerships</i> ✓ <i>Supply Diversity Program</i> • Insights from them • Recommendations to business, industry & Govt.	
	Tutorial 5:	Practical Examples and Reflections (Lecture 9& 10)	Discussions/quiz etc. based on the contents of Essential Readings of Lecture 9 & 10.
6	Lecture 11: Development process of Victoria's Social Procurement	• Setting the scene for the framework & overcoming barriers • Different SP approaches • Undertaking the SP process	Reading list:



SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
	Framework (SPF)	• Legal considerations & approvals needed • Removing common misconceptions about SP • Developing a business case for SP • Collecting information & resources about social enterprises & organizations involved	• SP- Ref 19 (Essential)
	Lecture 12: Overview of Social Procurement approaches	• Promotion- Recognising the positive impact of strategic purchasing e.g. Raising Awareness, Encouraging & Capacity Building • Purchasing- buying to achieve social impact e.g. One off direct purchasing, ongoing purchasing relationship • Procurement-Varying approaches to contracting e.g. Direct subcontracting, Employment requirements, Social clauses & Purchasing agreements and partnerships • Purpose, mechanisms & key questions • Case studies	• SP- Ref 19 • SP- Ref 20 • SP- Ref 21 (Essential)
	Tutorial 6:	Practical Examples and Reflections (Lecture 11& 12)	Discussions/quiz etc. based on the contents of Essential Readings of Lecture 11& 12.
7	Lecture 13: Undertaking Social Procurement (Planning, Enacting & Managing)	• Planning requirements • Activities prior to procurement • Procurement Cycle- ✓ <i>Effecting</i> ✓ <i>Planning</i> ✓ <i>Managing & Evaluation</i> • Subsequent activities after procurement • Risk Management strategy	Reading list: • SP- Ref 19 • SP- Ref 22 • SP- Ref 24 • SP- Ref 26 • SP- Ref 27 (Essential)



SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
		• Social clauses in tenders & contracts • Managing & Evaluation	• SP- Ref 23 • SP- Ref 25 (Optional)
	Lecture 14: Developing a business case for SP	• Key questions to be addressed • Cost-Benefit Analysis • Key risks & mitigation strategy • Business Case Template for SP • Case studies	• SP- Ref 19 • SP- Ref 28 • SP- Ref 29 • SP- Ref 30 (Essential)
	Tutorial 7:	Practical Examples and Reflections (Lecture 13& 14)	Discussions/quiz etc. based on the contents of Essential Readings of Lecture 13 & 14.
8	Lecture 15: Victoria's Social Procurement Framework (SPF) <i>Part-1</i>	• Purpose & approach of the framework • Scope of the SPF • Defining procurement activities & determining their value • SP purchasing guidelines • Framework requirements & expectations	Reading list: • SP- Ref 1-Sec. 3, 4 • SP- Ref 31 (Essential)
	Lecture 16: Victoria's Social Procurement Framework (SPF) <i>Part-2</i>	• Embedding SP- codes of conduct etc. • Planning & Tactical process • Implementation & Reporting process • Evaluation process • Other relevant policies, legislations & initiatives.	
	Tutorial 8:	Practical Examples and Reflections (Lecture 15& 16)	Discussions/quiz etc. based on the contents of Essential Readings of Lecture 15 & 16.
	Assignment 2:	Analysis of Social Procurement issues, barriers & challenges in different public sector services due to different regulatory, legislative and funding arrangements, and different cultures. <i>(Draft Report to be Submitted after peer review)</i>	
9	Lecture 17:	• Definition of supplier • SPF objectives & outcomes	Reading list:



SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
	Victoria's Factsheets of approved social benefit suppliers Guidelines for: 1. Aboriginal Businesses 2. SME's 3. Inclusive Employment	sought • Information on how to find govt. procurement opportunities • Raising awareness about how to respond to an invitation to supply • Compliance conditions of supply contract • Providing information regarding organizations involved in SP	• SP- Ref 32 • SP- Ref 33 • SP- Ref 34 (Essential)
	Lecture 18: Victoria's Factsheets of approved social benefit suppliers Guidelines for: 1. Australian Disability Enterprises 2. Public Construction Suppliers 3. All Suppliers	• Definition of supplier • SPF objectives & outcomes sought • Information on how to find govt. procurement opportunities • Raising awareness about how to respond to an invitation to supply • Compliance conditions of supply contract • Providing information regarding organizations involved in SP	• SP- Ref 35 • SP- Ref 36 • SP- Ref 37 (Essential) • SP- Ref 38 (Optional)
	Tutorial 9:	Practical Examples and Reflections (Lecture 17& 18)	Discussions/quiz etc. based on the contents of Essential Readings of Lecture 17 & 18.
10	Lecture 19: Victoria's Guide to Planning Procurement Buyer Guidance <i>Part-1</i>	• Planning requirements ✓ <i>Roadmap for social procurement planning</i> ✓ <i>Planning guidance for departments and agencies</i> ✓ <i>Planning guidance for government buyer</i> ✓ <i>Tools & templates</i> • Planning for innovation • Individual procurement activity requirements ✓ <i>overview of the sourcing phase of the procurement lifecycle</i>	Reading list: • SP- Ref 39 • SP- Ref 40 • SP- Ref 41 (Essential)



SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
		✓ <i>guide for govt. buyers on incorporating social& sustainable outcomes</i> ✓ <i>Clauses, objectives, benefits & model approaches</i>	• SP- Ref 42 • SP- Ref 43 • SP- Ref 44 (Essential) • SP- Ref 45 (Optional)
	Lecture 20: Victoria's Guide to Planning Procurement Buyer Guidance <i>Part-2</i>	• Evaluation ✓ <i>Incorporating SPF-related evaluation criteria and weightings</i> ✓ <i>Incorporating SPF-related evaluation criteria</i> ✓ <i>Example approach to scoring against SPF-related evaluation criteria</i> • Contract Management & reporting ✓ <i>Coordination of buyers and contract managers in relation to suppliers' SP commitments through procurement lifecycle</i> ✓ <i>Key activities and information that government buyers need to communicate to suppliers</i> ✓ <i>Overview of social procurement reporting requirement</i> • Closing & reviewing the contract	
	Tutorial 10:	Practical Examples and Reflections (Lecture 19& 20)	
11	Lecture 21: Victoria's Guide for preparing documents	• Developing the specification • Writing a specification for goods and services • Writing construction specifications • Developing evaluation criteria • Creating an evaluation plan & choosing an evaluation model • Selecting an evaluation panel • Developing the tender	Reading list: • SP- Ref 46 • SP- Ref 47 • SP- Ref 48 • SP- Ref 49 (Essential) • SP- Ref 50 • SP- Ref 51 (Optional)



SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
		- schedule • Creating the contract • Putting tender documents together	• SP- Ref 52 • SP- Ref 53 • SP- Ref 54 • SP- Ref 55 • SP- Ref 56 • SP- Ref 57 • SP- Ref 58 • SP- Ref 59 • SP- Ref 60 (Essential)
	Lecture 22: Templates and tools to help manage contracts and fix problems	• Implementing contract management • Requirements for contract management & contract disclosure • Mandatory requirements for goods & services • Manage relationships & conflicts • Manage changes to the contract • Tools and Templates	
	Tutorial 11:	Practical Examples and Reflections (Lecture 21& 22)	
12			Discussions/quiz etc. based on the Essential Readings of Lecture 21 & 22.
	Lecture 23: Impact of Procurement Policy & Practice on Social Sustainability	• Social sustainability- definition • Sustainable development strategy & focus • Issues that make procurement work for sustainability • Creating markets for green technology, products & services • Short & long term actions • Sustainability in the procurement process • Promoting more efficient use of public resources • Building sustainable procurement awareness, policies & practices	Reading list: • SP- Ref 61 • SP- Ref 62 • SP- Ref 63 • SP- Ref 64 • SP- Ref 65 (Essential) • SP- Ref 66 (Optional)
	Lecture 24: Procurement Framework in different countries	• Emergence of SP • Objectives & scope • Framework Policies & Legislation • Key Purchasing Principles • Evaluation Frameworks • Community Benefit	



SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
		Agreements • Social Return on Investment	
	Tutorial 12:	Practical Examples and Reflections (Lecture 23& 24)	Discussions/quiz etc. based on the contents of Essential Readings of Lecture 23 & 24.
	Assignment 3:	Analysis of Social Procurement issues, barriers & challenges in different public sector services due to different regulatory, legislative and funding arrangements, and different cultures. <i>(Final Report to be submitted)</i>	
13	Lecture 25: Factsheets on Sustainable Public Procurement (SPP) in National Governments around the world <i>UN report</i>	• Procurement in the national government • Policy framework • Institutional framework • Scope, goals and priorities • Implementation activities • Monitoring and evaluation • Indicators • ISO 20400 Sustainable Procurement guidance standard	Reading list: • SP- Ref 71 • SP- Ref 72 (Essential) • SP- Ref 78 (Optional) • SP- Ref 73 • SP- Ref 74 (Essential) • SP- Ref 75 • SP- Ref 76 • SP- Ref 77 (Optional)
	Lecture 26 SPP in India	• Initiation of Public Procurement Policy for India ✓ <i>Public Procurement Bill in 2012</i> • Need for Reorientation ✓ Transparency, Probity and Competition ✓ Market Access Issues ✓ Addressing Structural Weaknesses ✓ Sustainability Issues ✓ Enduring Principles the New Policy Must Uphold • Policy Coherence with other Major Macroeconomic National Policies	
	Tutorial 13:	Practical Examples and Reflections (Lecture 25 & 26)	



SOCIAL PROCUREMENT			
Week No.	Lecture	Topic	Learning Activities
14	Group Discussions	Date and Topics TBA later	
	Final Presentation	Date and Topics TBA later	

6.0 PEDAGOGICAL APPROACH, ACTIVITIES

The pedagogical approach is based on classroom lectures of up to 1 hour duration twice a week during the course. The lectures will involve a range of teaching topics, which will include theoretical background on social procurement & relevant issues. The teaching modes apart from classroom lectures will include various group activities such as, group tasks, group discussions, preparation of case studies, evaluation of existing social benefits & their effect on social, economic & technological developments, and guest presentations from industry professionals on specific topics to provide both specialist knowledge and state of the practice to give an insight to real world issues. Seminars will be held every week so that each student can share their knowledge, ask questions and dive further in to the subject materials. The timings of the scheduled activities will be provided at the beginning of the course, depending on the annual academic calendar of the college.

7.0 ASSESSMENT

Assessment in this subject has both formative and summative aspects to it. The students will have an opportunity to provide formative feedback to their peers and receive constructive feedback in return, as well as from the subject coordinator. This will give them the opportunity to develop and improve on particular skills throughout the course of the subject.

There are five assessment tasks in this subject. The assessment tasks (class participation, assignment 1 to 3 and final presentation) mimic the activities that a student is most likely to undertake in a real situation. This task will be used to



demonstrate that the student have developed the skills needed to understand the behaviour of appropriate type of material.

The students' main tasks will be to identify appropriate type of material, study different characteristics and present their findings in a professional report and an oral presentation. A summary of the marking scheme is provided in Table 2. Specific requirements for each task are provided in section 7.1 and 7.2.

7.1 Class Participation

The subject involves a range of activities and participation of the student is critical for achieving the learning outcome of the subject. The assessment for this task will involve a number of in-class discussion and quizzes relating to content covered during tutorials. The students will be assessed on their ability to

- Understand and interpret themes discussed during seminars
- Respond appropriately to questions.

7.2 Assignment

7.2.1 Analysis of Social Procurement issues, barriers & challenges in different public sector services due to different regulatory, legislative and funding arrangements, and different cultures.

The student will be asked to undertake an analysis of different public sector services & organizations with different culture, regulatory, legislative and funding arrangements in a systematic manner in order to ascertain the current state of sustainable public procurement (SPP) policies, activities, programmes, and monitoring and evaluation systems existing in those organizations. In this respect the students have to prepare a questionnaire based on their knowledge of the subject to obtain detailed information about the SPP-related policies, provisions, laws, projects, activities and monitoring systems in place. The report will have to include the following sections:

Procurement: Provides an estimate value of total procurement expenditure for SPP activities based on the data provided by the organization in the questionnaire.

Policy framework: Includes information on policies and laws on SPP.



Institutional framework: Details the entities that are in charge of SPP policies and what role they each play in their design, implementation and enforcement.

Scope, goals and priorities: Lists the sustainability aspects and goals that each organization focuses on in the framework of its SPP policy.

Implementation activities: Lists the activities and projects that the organization implements on the ground to foster SPP, e.g. development of SPP criteria and guidelines, training opportunities, development of new management software, and the amount of economic resources invested in them.

Monitoring and evaluation: Indicates whether any monitoring and evaluation frameworks for SPP exist and what form they take (e.g. frequency, public organisations monitored, data sources and reporting mechanisms).

Indicators: Mentions what targets and goals have already been achieved in terms of SPP implementation.

The analysis of the current study as well as the recommendations with explanations will have to be submitted to the Co-ordinator of the course with a copy to DTE, Govt. of Assam/Principal, Assam Engineering College in the form of a report.

The exact structure of the report is up to the student, but the student should attempt to address the above mentioned areas in his/her report.

Report Format

The report should be presented in A4 format with margins of 2.5 cm on each side and the pages numbered. The line spacing should be 1.5 cm. Both sides of the page should be utilized for printing.

Heading, tables, diagrams are to be used and appropriately numbered. An abstract or executive summary at the beginning of the report is to be included (which will include key findings and recommendations). There is no page limit as such for the report, but it should be approximately 5000 words in length (excluding tables, diagrams and references)

Use of references to existing research/literature in order to support the argument of the report is to be included and properly referenced. The Harvard referencing format (i.e. Author (year)) should be used to cite specific references and all the references should be referred to in a 'References' section at the end of the report.



As the student will be presenting the report and its major findings to subject coordinator and invited panel members during the last week of the semester, the report should be written in a style and format that reflects its intended purpose.

The students are advised to refer to online skill development courses provided by www.coursera.org to get a better idea of how to put their ideas to words. The following links may be useful for the students

<https://www.coursera.org/learn/business-writing>

<https://www.coursera.org/specializations/academic-english>

Submission – Draft Report

The students are required to submit a draft of their report at the end of week 4. The draft report should, as a minimum be structured and formatted as it is planned to present the final report. It should include all the items as mentioned in clause 7.2.1

The Draft Report **should not** provide any identifying details (name, enrolment number etc.) that could be used to identify the student, as the peer review process will be anonymous. Submit your draft report in print form with proper spiral bind.

7.2.2 Peer Review

Students are required to critically review one of their colleagues' draft reports and provide constructive feedback on how they might be improved. The review should be approximately between 500-1000 words. Primary focus should be on the strengths and weakness of the peer's draft report and how well they address the requirement of the task across the following criteria.

- Abstract / Executive summary
- Table of contents provided
- Use of diagrams/description to effectively illustrate the problem at hand.
- Indication of potential areas for improvement..
- Indication of potential areas for improvement in the form of energy efficiency, carbon footprint and sustainability issues.
- Suggested solutions.
- Presented in a concise, professional and well-structured manner.
- Integration of references to relevant literature.



The peer review should focus on making suggestions to help the peer further develop and improve their report.

Peer Review Assessment Criteria

The student will be assessed in his ability to:

- Demonstrate a complete understanding on the subject matter.
- Apply that understanding to the analysis and critique of the peer's draft report.
- Critically evaluate the work of peer's and provide constructive feedback.
- To use skill and sensitivity in providing formative (constructive) feedback to their peers.

The peer feedback of a draft report of a student will be provided to the student after the completion of the process i.e. by Week 8.

7.2.3 Submission – Final Report

The final report should be submitted in printed form after considering and incorporating the suggestions made in the peer review comments (if any). Reports submitted after the due date will incur a 10 % penalty of the available marks in that section, unless prior application for special consideration has been submitted and approved.

Final Report Assessment Criteria

The student will be assessed on their ability to

- Use of diagrams/description to effectively illustrate the problem at hand.
- Indicate potential areas for improvement.
- Suggested solutions.
- Presented in a concise, professional and well-structured manner.
- Integration of references to relevant literature.

7.2.4 Final Presentation

The student will present the major findings from his/her final report to the panel members (co-ordinator and invited reviewers). The ideas that have been identified have to be presented.



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Format

The presentation should be addressed to the panel members, the student is welcome to present in an own format, but it has to be remembered that the format maximises the exposure to the content of the presentation.

Presentation : 15 minutes followed by Q & A: 5 minutes

Assessment Criteria

The presentation will be assessed by the panel members on the way of presentation and communication skills. The student will be assessed on his/her ability to:

- Express his/her knowledge of social procurement concepts.
- Describe the existing SPP-related policies, provisions, laws, projects, activities and monitoring systems in place in different countries.
- Convince the panel members of the need to switch to sustainable public procurement practices and explain the rationale behind it.

Presentation date: Week 14.

Students are required to be available for the entire week. The time of presentation will be advised at a later date.

7.3 Marking Scheme

(It is to be revised as per Indian University/Affiliated university regulation)

Table 2 provides the detailed marking scheme in this subject.



Table 2: Summary of Assessment Tasks & Marking Scheme

Assessment category	Brief Discussion	Weight (%)	Pass (%)	To pass, a student has to	
				obtain a minimum marks of	Out of
Class participation	Participation in weekly activities and active involvement in class discussion	10	4	8	20
Assignment 1 (Draft)	See Below	10	4	8	20
Assignment 2 (Peer Review)	Review of peer report (1000 words)	10	4	8	20
Assignment 3 (Final)	Professional report outlining as assessment of building materials and suggestions for improvement. (5000 words)	10	4	8	20
Final Presentation	Presentation of report findings and recommended improvements.	10	4	8	20
End semester exam	Theory based.	50	20	40	100
Total	--	100	40	80	200

The students will have to appear in an end semester examination (as per the guidelines of the University under which AEC is affiliated) which will be subjective in nature. A minimum mark of 40% (each assessment category) must be achieved in the examination in order to pass the subject. The assignments/ presentations can be re-submitted in a semester if a student fails to score the requisite pass marks. However, if a student fails to achieve 40 % marks in the theory exam he will be deemed to fail in the subject and will have to clear in the next attempt.

8.0 REQUIRED READING

Students are expected to refer to social procurement related topics from different sources, which might include case studies, conferences papers, library collections, eBooks and e-Journals.

A list of essential and optional reading is provided in Table – 3.

9.0 ATTENDANCE POLICY

The attendance policy is as per the standard university guidelines (under which AEC is affiliated).

10.0 PLAGIARISM, COLLUSION AND CONSEQUENCES

Merriam-Webster's online dictionary explains that **Plagiarism** is the act of stealing and passing off (the ideas or words of another) as one's own; or using another's production without crediting the source; or to commit literary theft i.e. to present as new and original an idea or product derived from an existing source.

Collusion is the presentation by a student of an assignment as his or her own which is in fact the result in whole or part of unauthorised collaboration with another person or persons.

In any case where a student has been involved in plagiarism or collusion in an assessable assignment on task the marks awarded for that will be zero, and no substitution of an alternative task will normally be permitted.

11.0 Reading List

The reading list (as provided in Table 3) provides the literature that a student is expected to go through to understand the topics of the syllabus. However, this list is not an extensive one and may be updated and altered as and when necessary. Students are encouraged to come up with suggested literature in this field for discussion in or off the class.



Table 3: Reading List

Reading	Reference	Suggested Literature
SP- Ref 1	Lecture 1 & Lecture 2	Victoria's Social Procurement Framework–Buyer Guidance Guide to key concepts, pp. 1-17, 2018.
SP- Ref 2		Beyond Value for Money: Social Procurement for Victorian Local Government. Second Edition, © The State of Victoria, pp. 1-36, 2018.
SP- Ref 3		Jo Barraket and Janelle Weissman, Social Procurement and its Implications for Social Enterprise, The Australian Centre for Philanthropy and Non-profit Studies, Queensland Univ. of Technology, Australia, pp. 1-35, Dec 2009.
SP- Ref 4		Introduction: 'The Importance of Social Procurement in the Public Sector', Chris Newman, The Global Procurement Network, pp. 1-12, 2018.
SP- Ref 5	Lecture 3 and Lecture 4	Christine Harland, Guy Callendar, Louise Knight, Jan Telgen, Khi Thai & Helen Walker, Public Procurement as a Lever Of Government Reform: International Research Evidence, pp. 1-17, March 21, 2017.
SP- Ref 6		Christine Harland, Jan Telgen, and Guy Callender, International Research Study of Public Procurement, ResearchGate, pp. 374-401, 8 March 2017.
SP- Ref 7		Keith F. Snider and Rene G. Rendon, Public Procurement Policy: Implications For Theory And Practice, Journal of Public Procurement, Vol. 8, Issue 3, pp. 310-333, 2008.
SP- Ref 8		Andrea Patrucco, Davide Luzzini, Stefano Ronchi, Michael Essig, Markus Amann & Andreas H. Glas, Designing a public procurement strategy: lessons from local government, pp. 1-10, 24 October 2017.
SP- Ref 2	Lecture 5 and Lecture 6	Beyond Value for Money: Social Procurement for Victorian Local Government. Second Edition, © The State of Victoria, pp. 1-36, 2018.
SP- Ref 3		Jo Barraket and Janelle Weissman, Social Procurement and its Implications for Social Enterprise, The Australian Centre for Philanthropy and Non-profit Studies, Queensland Univ. of Technology, Australia, pp. 1-35, Dec 2009.
SP- Ref 9		Joanne McNeill, Insights Into Social Procurement: From Policy to Practice, Social Procurement Australasia, pp. 1-24, 2015.
SP- Ref 3	Lecture 7 and Lecture 8	Jo Barraket and Janelle Weissman, Social Procurement and its Implications for Social Enterprise, The Australian Centre for Philanthropy and Non-profit Studies, Queensland Univ. of Technology, Australia, pp. 1-35, Dec 2009.
SP- Ref 10		Public Procurement for Innovation, Charles Edquist, Nicholas S. Vonortas, Jon Mikel Zabala-Iturriagagoitia & Jakob Edler, EU-SPRI Forum on Science, Technology & Innovation Policy Series, Edward Elgar Publishing, Inc. pp. 1-338, 2015.



Reading	Reference	Suggested Literature
SP- Ref 11		Measuring the Impact of Social Procurement: A New Approach, Ingrid Burkett & Joanne McNeill, Social Traders, pp.1-21, 2015. info@socialtraders.com.au
SP- Ref 12		Social procurement guide, Adding social value when buying for government, Office of the Chief Advisor – Procurement, Queensland Govt., Vol.1, No. 2, June 2018.
SP- Ref 13		David LePage, Exploring Social Procurement, Accelerating Social Impact CCC, Ltd., pp. 1-48, March 2014.
SP- Ref 14		Chapter-5, Investigating the Barriers to Sustainable Procurement in the United Nations, Humanitarian Logistics and Sustainability, Jacob Hasselbalch, Nives Costa and Alexander Blecken, Springer International Publishing Switzerland, 2015.
SP- Ref 15		C. T. de Souza Dutra et al., Barriers and Challenges to the Sustainability Requirements Implementation in Public Procurement of Engineering Works and Service, Open Journal of Civil Engineering, 2017, 7, pp. 1-13, Jan 2017.
SP- Ref 16		Balancing social, environmental and economic considerations in procurement, Supplement to the 2012 Annual Statistical Report on United Nations Procurement, UNOPS, Copyright © 2013.
SP- Ref 17	Lecture 9 and Lecture 10	Ingrid Burkett, Social Procurement in Australia, Adding social benefits to public, private and non-profit sector purchasing and procurement The Centre for Social Impact, University of NSW, © 2010.
SP- Ref 18		Corporate Social Procurement In Australia, Business Creating Social Value, Social Traders, Research Report Copyright © Social Traders 2014.
SP- Ref 19	Lecture 11 and Lecture 12	Social Procurement: A Guide for Victorian Local Government, Published by the Department of Planning and Community Development, © Copyright State Government of Victoria 2010.
SP- Ref 20		Victoria's Social Procurement Framework, Frequently Asked Questions, pp. 1-8, © The State of Victoria 2018.
SP- Ref 21		Social Procurement: Expert Support Program, Social Procurement Engagement & Awareness Strategy, For Victorian Councils, Department of Planning & Community Development, pp. 1-20, 2018.
SP- Ref 19	Lecture 13 and Lecture 14	Social Procurement: A Guide for Victorian Local Government, Published by the Department of Planning and Community Development, © Copyright State Government of Victoria 2010.
SP- Ref 22		Risk Management in the Procurement of Innovation, Concepts and empirical evidence in the European Union, pp. 1-130, 2010. http://ec.europa.eu/research/research-eu
SP- Ref 23		Tarmo Kalvet & Veiko Lember, Risks Management In Public Procurement For Innovation: The Case of Nordic-Baltic Sea Cities, pp. 1-31, Innovation The European Journal of Social Science Research 23(3):241-262, September 2010.
SP- Ref 24		Social Procurement Clauses, Office of the Chief Advisor –



Reading	Reference	Suggested Literature
		Procurement, Queensland Govt., pp. 1-11, Vol.1, Nov. 2017.
SP- Ref 25		Social Procurement in NSW, A Guide to Achieving Social Value through Public Sector Procurement, Social Procurement Action Group (SPAG), Oct. 2012. www.socialenterprises.com.au/
SP- Ref 26		Social Clauses: Why So Important & How To Implement Them, Social Economy Federation for Brussels & Wallonia, July 2015.
SP- Ref 27		Deirdre Halloran, The Social Value In Social Clauses – Methods of Measuring & Evaluation In Social Procurement, pp.1-21, 1 November 2017.
SP- Ref 28		Building The Business Case For Sustainable Procurement In Australia – Guidance, Australian ISO 20400 Committee, pp. 1-42, 2018. sustainbus@environment.nsw.gov.au
SP- Ref 29		Victoria's Social Procurement Framework Supplier Guidance, Supplier FAQ, pp. 1-8, Victoria State Govt., 2018.
SP- Ref 30		Bonwick, M., Daniels, Social Procurement: The Business Case, Corporate Social Procurement in Australia: Businesses Creating Social Value. Social Procurement Australasia, pp. 1-16, 2014.
SP- Ref 1	Lecture 15 and Lecture 16	Victoria's Social Procurement Framework– Buyer Guidance Guide to key concepts, pp. 1-17, 2018.
SP- Ref 31		Victoria's Social Procurement Framework, Authorised and published by the Victorian Government, © The State of Victoria 2018.
SP- Ref 32	Lecture 17 and Lecture 18	Victoria's Social Procurement Framework Supplier Factsheet, Victorian Aboriginal Businesses, pp. 1-5, 2018.
SP- Ref 33		Victoria's Social Procurement Framework Supplier Factsheet, Small to Medium Enterprises, pp. 1-4, 2018.
SP- Ref 34		Victoria's Social Procurement Framework Supplier Factsheet, Inclusive Employment, pp. 1-3, 2018.
SP- Ref 35		Victoria's Social Procurement Framework Supplier Factsheet, Victorian ADEs (Australian Disability Enterprises), pp. 1-5, 2018.
SP- Ref 36		Victoria's Social Procurement Framework Supplier Factsheet, All Suppliers, pp. 1-5, 2018.
SP- Ref 37		Victoria's Social Procurement Framework Supplier Factsheet, Public Construction Suppliers, pp. 1-5, 2018.
SP- Ref 38		Victoria's Social Procurement Framework Supplier Guidance, Supplier FAQ's, pp. 1-8, 2018.
SP- Ref 39	Lecture 19 and Lecture 20	Innovation & The Procurement Process – Procurement Guide, Encouraging and Facilitating Innovation In Procurement, Dept. of Treasury & Finance, pp. 1-4, 25 Oct. 2012.
SP- Ref 40		Victoria's Social Procurement Framework – Buyer Guidance, Guide To Planning Requirements, pp. 1-26, 1 Sept. 2018.



Reading	Reference	Suggested Literature
SP- Ref 41		Victoria's Social Procurement Framework – Buyer Guidance, Guide To Individual Procurement Activity Requirements, pp. 1-65, 1 Sept. 2018.
SP- Ref 42		Victoria's Social Procurement Framework – Buyer Guidance, Guide to Evaluation, pp. 1-23, 1 Sept. 2018.
SP- Ref 43		Victoria's Social Procurement Framework – Buyer Guidance, Guide To Contract Management and Reporting, pp. 1-20, 1 Sept. 2018.
SP- Ref 44		Appendix 7 – Supplier Customer Satisfaction Survey, Department of Treasury & Finance, pp.1-2, 27 Nov. 2012.
SP- Ref 45		Historical supplier scorecard tracking, Department of Treasury & Finance, 25 Oct. 2012.
SP- Ref 46	Lecture 21 and Lecture 22	Buying For Victoria https://buyingfor.vic.gov.au/social-procurement-framework
SP- Ref 47		Social Procurement Toolkit, Department of Planning & Community Development, State Govt. of Victoria, pp. 1-90, www.mav.asn.au
SP- Ref 48		Insurance Provisions – Procurement Guide, Selecting The Level of Insurance Appropriate For The Complexity & Risk of The Procurement Activity, Department of Treasury & Finance, pp. 1-8, State of Victoria 2017.
SP- Ref 49		Intellectual Property Guidelines, for the Victorian Public Sector (Version 1), pp. 1-92, Dept. of Treasury & Finance, March 2015.
SP- Ref 50		Successful Tendering Guide-The Tender Process, Invest Northern Ireland, pp. 1-32, June 2012.
SP- Ref 51		Procurement Guidelines For Tender Preparation, Evaluation and Award of Contract, Manual on Small Earth Dams, A Guide To Siting, Design And Construction, pp. 101-114, 2000.
SP- Ref 52		Contract Management Checklist, Dept. of Treasury & Finance, pp. 1-6, 27 Nov. 2012.
SP- Ref 53		Victorian Government Purchasing Board, Contract Management Plan Template – Long Form, (Appendix 3), pp. 1-22, © State of Victoria 2014.
SP- Ref 54		Appendix 2 – Contract Management Plan Short Form, Dept. of Treasury & Finance, © State of Victoria 2014.
SP- Ref 55		Contract Risk Segmentation Tool, Dept. of Treasury & Finance, © State of Victoria 2014.
SP- Ref 56		Appendix 8 –Contract Issues Log, Dept. of Treasury & Finance, © State of Victoria 2014.
SP- Ref 57		Appendix 1B –Defining Criticality To Business Assessment, Dept. of Treasury & Finance, © State of Victoria 2014.
SP- Ref 58		Emily Adhiambo Okonjo, Procurement Risk Management Practices & Supply Chain Performance of Mobile Phone Service Providers In Kenya, Research Project, University of Nairobi, pp. 1-81, Oct. 2014.
SP- Ref 59		Appendix 5 – RACI Template, Dept. of Treasury & Finance, pp. 1-2, © State of Victoria 2014.



Reading	Reference	Suggested Literature
SP- Ref 60		Policy Five: Contract Management & Contract Disclosure, Version 1.1, pp. 1-6, State of Victoria 2015.
SP- Ref 61	Lecture 23 and Lecture 24	The Impact of Procurement Policy & Practice on Social Sustainability, Towards An Operational Framework, A Report By Chris Church & Jan Mcharry, pp. 1-31, March 2006.
SP- Ref 62		Sustainable Procurement Guide, Dept. of Environment & Energy, Australian Govt., © Commonwealth of Australia, 2018.
SP- Ref 63		Cathy Berry & Shaun McCarthy, Guide to Sustainable Procurement In Construction, CIRIA C695, Published by CIRIA, Classic house, London, 2011.
SP- Ref 64		Public Procurement as a Tool For Promoting More Sustainable Consumption & Production Pattern, Sustainable Development Innovation Brief, Issue 5, pp. 1-12, August 2008.
SP- Ref 65		Chapter 3- Sustainable Procurement policies & Practices at the State & Local Govt. Level, Danielle M. Conway, pp. 43-74. https://www.law.hawaii.edu/.../Green%20Govt%20Chapter%203%20-%20Conway.pdf
SP- Ref 66		Public Procurement for Sustainable and Inclusive Growth, Enabling Reform Through Evidence & Peer Reviews, Organisation for Economic Co-operation and Development, OECD, 2 rue André-Pascal, 75016, Paris, France.
SP- Ref 67		A Guide To Social Procurement, Copyright © Buy Social Canada CCC Ltd. 2018.
SP- Ref 68		Louisa Young & Felicia Chandra, Recommendations for Evaluating Social Procurement Policy within the Canadian Federal Government, pp. 1-71, Sept. 13, 2017.
SP- Ref 69		Procurement Policy, City of WhiteHorse, Victoria, Australia, pp. 1-25, June 2018.
SP- Ref 70		Nicholas S. Vonortas, Pushmeet Bhatia & Deborah P. Mayer, Public Procurement And Innovation In The United States, Final Report, The George Washington University, pp. 1-63, 2011.
SP- Ref 71	Lecture 25 and Lecture 26	Sandra Hamilton, Social Procurement, WTO Symposium– Sustainable Procurement, Feb. 22, 2017.
SP- Ref 72		Factsheets on Sustainable Public Procurement In National Governments, Supplement To The Global Review of Sustainable Public Procurement, UN Environment Report, pp. 1-168, 2017.
SP- Ref 73		Bhabesh Hazarika & Pratap Ranjan Jena, Public Procurement in India: Assessment of Institutional Mechanism, Challenges, and Reforms, No. 204, National Institute of Public Finance and Policy New Delhi, NIPFP Working paper series, 31-July-2017.
SP- Ref 74		Bulbul Sen & Archana Jatkar, Elements of a Public Procurement Policy for India, Discussion Paper, © CUTS International 2015.



Reading	Reference	Suggested Literature
SP- Ref 75		Sustainable Public Procurement in India: Walk the Talk, Sanjay Kumar, DFCCIL, Ministry of Railways, Global Procurement Summit 2018, New Delhi, India.
SP- Ref 76		Engagement with Sustainability Concerns in Public Procurement in India: Why and How, The Energy and Resources Institute TERI Policy Brief, pp. 1-12, Issue 8 July 2013. www.teriin.org
SP- Ref 77		Sustainable Procurement Policy, For Godrej Industries (Chemicals), pp. 1-13, August 2017.
SP- Ref 78		ISO 20400 Sustainable Procurement Guidance Standard, International Organization for Standardization, © ISO, 2017.

12.0 Subject Coordinator Contact Details:

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For any query please contact the subject coordinator over phone or email.

The study materials for the entire subject have been developed and will be available electronically.



MASTER OF CONSTRUCTION MANAGEMENT
ASSAM ENGINEERING COLLEGE
GUWAHATI-781013

CONSTRUCTION SAFETY
(SUBJECT GUIDE)

(Version-1.0)
Revised by – Dr. Manjuri Hazarika



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1.0 INTRODUCTION

Safety and health risk assessment is the core of any safety practices in all types of industries. Implementation of safety measures in construction projects is of utmost importance. Construction is a high hazard industry that comprises a wide range of activities involving construction, alteration, and repair. Construction workers engage in many activities that may expose them to serious hazards, such as falling from rooftops, unguarded machinery, being struck by heavy construction equipment, electrocutions, etc. Government has applied strict rules for recognition and control of Occupation Safety and Health (OSH) Hazards, workers' rights and employer responsibilities while executing a construction project. OSH hazards associated with execution of construction projects, evaluation and control is the most essential for successful completion of a project. Emphasis needs to be placed on recognition, evaluation and control of safety hazards particularly as they relate to the Occupational Safety and Health Act. The Occupational Safety and Health Ordinance, covers most workplaces in order to protect the safety and health of employees at work.

2.0 OVERVIEW & OBJECTIVES OF THE SUBJECT

The essential knowledge of different types of hazards and their control associated with construction industry is covered in this subject. The main objective of this subject is to provide working knowledge on the recognition, avoidance, abatement, and prevention of safety and health hazards in workplaces associated with the construction industry. The course also provides information regarding workers' rights, employer responsibilities, and how to file a complaint. Construction safety measures followed in different countries of the world are presented for exposure to the global scenario. This subject will make the students aware of the importance of following safety measures and rules in construction industry and help them to promote the sense of civic duty and responsibility with high moral and ethical standards. It will impart exposure to the students about the use of latest techniques and tools like IoT, Virtual Reality, Robotics, BIM etc. for enhancing safety in a construction project.



This subject guide helps the intended student and other readers to understand the basic objectives of this subject and how the students will be assessed during and after the completion of the course. Course curriculum is designed to cater to the issues to fulfil the safety needs of the entire urban as well as the rural construction.

3.0 LEARNING OUTCOMES

On completion of this subject the student is expected to:

- Understand the basic safety and health hazards and practices in construction
- Gain knowledge of the globally recognized codes/guidelines for safety in construction
- Learn workers' rights and employer responsibilities
- Become professional construction managers with a sense of civic duty and responsibility
- Recognize common hazards in construction and take measures to prevent accidents
- Use the latest techniques for safety measures

4.0 GENERIC SKILLS

On completion of the subject students should develop the following skills and capabilities:

- Knowledge of basic safety and health hazards and practices in construction
- Knowledge of workers' rights and employer responsibilities
- Understanding of the critical issues to prevent accidents in construction sites
- Ability to undertake problem identification, formulation, and solution
- Capacity for creativity and innovation.
- Understanding of professional and ethical responsibilities, and commitment to them.



5.0 TABLE 1: DETAILED SUBJECT SCHEDULE

Total contact period : 45 hours

Duration of Lecture : 1 Hour

Duration of tutorial : 2 hours

Week	Lecture	Topic	Resources
1	Lecture 1	Introduction to Occupational Safety and Health (OSH) in Workplace • ILO guidelines to OSH • OSHA • OSH Management System ○ Objective ○ Policy & guidelines ○ Planning & implementation ○ Evaluation ○ Action for improvement • OSHA guidelines for construction safety	Reading list CS-1-1 CS-1-2 CS-1-3 CS-1-4
	Lecture 2	International Codes of Practice for OSH in Different Countries • Existing OSHA Standards • Voluntary OSHA Standards • OSH laws and regulations in construction • Construction safety measures in developing and developed countries	Reading list CS-2-1 CS-2-2 CS-2-3 CS-2-4 CS-2-5
	Lecture 3	National codes and guidelines for OSH in India • National Policy on Safety, Health and Working Environment • Laws and Regulations • National Programme on OSH • Legal Framework	Reading list CS-3-1 CS-3-2 CS-3-3 CS-3-4 CS-3-5
2	Tutorial 1	Discussion on different international safety codes/guidelines for OSH and comparison of the safety practices implemented in India.	
	Lecture 4	Construction Safety • Basic safety rules on construction site • Workplace safety and its benefits	Reading list CS-4-1 CS-4-2



Week	Lecture	Topic	Resources
		- Personal safety and hygiene - Emergency response to accidents - Workers' participation and training - Safety checklist	
	Tutorial 2	Discussion on observations of safety measures in an ongoing local construction project and suggestions for improvement, quiz etc.	
3	Lecture 5	Common Sources of Hazards in Construction - Fall from height - Ladders and stairways - Cranes and forklifts - Noise and vibration - Hazards from chemicals - Electrical and fire hazards	Reading list CS-5-1 CS-5-2
	Lecture 6	Continued - Floor and wall openings - Elevated surfaces - Excavations - Trench collapse - Scaffold collapse - Failure to use personal protective equipment for head, eye, face, foot, and hand	Reading list CS-6-1 CS-6-2 CS-6-3
	Tutorial 3	Worked Examples and Reflections (Lecture 5 & 6) Discussions/quiz based on the contents of Lecture 5 & 6.	
4	Lecture 7	Identification and Assessment of Hazards - Preliminary assessment - Collection of existing information about job site hazards - Inspection of the job site for additional safety hazards (Use Checklist) - Identification of health hazards (Use Checklist)	Reading list CS-7-1 CS-7-2 CS-7-3
	Lecture 8	Continued Identification of hazards associated with	Reading list CS-8-1



Week	Lecture	Topic	Resources
		emergency and nonroutine situations • Characterization of the nature of identified hazards • Prioritization of the hazards for control • Case Study	CS-8-2 CS-8-3
	Tutorial 4	Worked Examples and Reflections (Lecture 7 & 8) Discussions/quiz based on the contents of Lecture 7 & 8.	
	Assignment 1	Construction Safety-Draft Report Due	
5	Lecture 9	Protecting Construction Workers in Confined Spaces • Confined spaces in construction • Permit spaces • Dangers in confined spaces • Work Covered by the Standard • Worker Training • Rescue and Emergency Services • Confined Spaces in Residential Construction	Reading list CS-9-1 CS-9-2
	Lecture 10	Health & Safety Issues in Handling Construction Waste • Occupational risk of the informal sector in handling of waste • Occupational health & safety guidelines for handling of waste • Duties of employer in deploying waste handling personal	Reading list CS-10-1 CS-10-2
	Tutorial 5	Worked Examples and Reflections (Lecture 9 & 10) Discussions/quiz based on the contents of Lecture 9 & 10.	
6	Lecture 11	Prevention and Control of Hazards • Identification of hazard control options • Selection of hazard control method ○ Elimination ○ Substitution ○ Engineering Controls ○ Administrative Controls ○ PPE (Personal Protective	Reading list CS-11-1 CS-11-2



Week	Lecture	Topic	Resources
		Equipment)	
	Lecture 12	Continued - Develop and update a hazard control plan - Selection of hazard controls to protect workers during nonroutine tasks and emergencies - Implementation of the selected plan on the job site and follow up for effectiveness - Case Study	Reading list CS-12-1 CS-12-2 CS-12-3
	Tutorial 6	Field trip to a local construction site in the area of Guwahati Municipal Corporation (GMC) and study the existing OSH plan	
7	Lecture 13	OSH Program Evaluation and Improvement - Establishing effective communication and coordination in all levels of hierarchy - Confirmation of OSH program implementation - Performance monitoring and measurement - Audit	Reading list CS-13-1 CS-13-2 CS-13-3
	Lecture 14	Continued - Management review - Identifying opportunities to improve - Correction of program shortcomings - Action for improvement - Continuous improvement	Reading list CS-14-1 CS-14-2 CS-14-3 CS-14-4
	Tutorial 7	Worked Examples and Reflections (Lecture 13 & 14) Discussions/quiz based on the contents of Lecture 13 & 14	
8	Lecture 15	Education and Training on OSH - Job Specific Training - Periodic Retraining	Reading list CS-15-1 CS-15-2 CS-15-3



Week	Lecture	Topic	Resources
		Safety and health program awareness training of managers, supervisors, workers, contractor, temporary agency workers	
	Lecture 16	Continued - Training of employers, managers, and supervisors on their roles in the safety program - Training of workers on their specific roles in the safety and health program - Training of workers on hazard identification and controls	Reading list CS-16-1 CS-16-2
	Tutorial 8	Worked Examples and Reflections (Lecture 15 & 16) Discussions/quiz based on the contents of Lecture 15 & 16	
	Assignment 2	Peer Review Report (1000 words)	
9	Lecture 17	Workers' Right and Employer's Responsibility - Workers' Rights under the OSH Act - Employer Responsibilities - Protections for temporary workers	Reading list CS-17-1 CS-17-2 CS-17-3
	Lecture 18	Continued - Additional Whistle blower Program - Protection from retaliation - Filing a complain - OSHA worksite investigations	Reading list CS-18-1 CS-18-2
	Tutorial 9	Worked Examples and Reflections (Lecture 17 & 18) Discussions/quiz based on the contents of Lecture 17 & 18	
10	Lecture 19	Innovative & Automated Approaches - Need for automated safety measures - Automated safety technologies - Building Information Modelling (BIM)	Reading list CS-19-1 CS-19-2 CS-19-3



Week	Lecture	Topic	Resources
		○ Additive Manufacturing ○ Virtual Reality (VR)	
	Lecture 20	Continued ○ Internet of Things (IoT) ○ Robots ○ Software Engineering for Construction Safety ○ RAND Appropriateness Study	Reading list CS-20-1 CS-20-2
	Tutorial 10	Field trip to a local construction site, study the existing OSH plan and suggest some automated safety measures	
11	Lecture 21	Sustainable Construction and Worker's Safety • Sustainable construction • Integration of worker safety and Sustainable construction • Safety performance and critical safety issues in green building construction projects • comparison of green and conventional building construction projects	Reading list CS-21-1 CS-21-2
	Lecture 22	Safety Scenario in Indian Construction • OSH scenario in India • Indian laws & regulations on OSH • Provision of OSH training • Support mechanisms • Industry-specific policies in OSH • Research in OSH	Reading list CS-22-1 CS-22-2 CS-22-3 CS-22-4
	Lecture 23	Case Studies • Case Study 1 • Case Study 2 • Case Study 3	Reading list CS-23-1 CS-23-2 CS-23-3
	Tutorial 11	Discussion on a local Case Study	
	Assignment 3	Construction Safety-Final Report due	
12	Group	Date and Topics TBA later	



Week	Lecture	Topic	Resources
	Discussions		
	Final Presentations	Date and Topics TBA later	

6.0 PEDAGOGICAL APPROACH, ACTIVITIES

The pedagogical approach is based on classroom lectures of up to 1 hour duration twice a week during the course. The lectures will involve a range of teaching topics, which will include theoretical background on occupational safety and health hazards and safety practices in workplace with a primary focus on safety in construction sites. The teaching modes apart from classroom lectures will include various group activities, such as, group tasks, site visits, preparation of case studies, evaluation of existing safety measures implemented in the local industries and construction sites, and talks and presentations from industry professionals on specific topics to provide both specialist knowledge and state of the art safety practices in construction. Seminars will be held every week so that each student can update and share their knowledge, ask questions and gain in-depth knowledge of the subject.

The timings of the scheduled activities will be provided at the beginning of the course, depending on the annual academic calendar of the college.

7.0 ASSESSMENT

Assessment of the subject contains both formative and summative components. The students will have an opportunity to provide formative feedback to their peers and receive constructive feedback in return, as well as from the subject coordinator. This will give them the opportunity to develop and improve on particular skills throughout the course of the subject.

There are five assessment tasks in this subject. The assessment tasks (class participation, assignment 1 to 3 and final presentation) resemble the activities that a student is most likely to undergo in a real situation. These tasks will be used to assess that the student have developed the required skills needed to develop a proper safety plan for a construction site and suggest possible solutions to improving



the OSH management scenario and communicate their findings in a professional context.

The students' main tasks will be to map, assess and suggest improvements to a construction safety plan and present their findings in a professional report and an oral presentation. A summary of the marking scheme is provided in Table 2. Specific requirements for each task are provided in section 7.1 and 7.2.

7.1 Class Participation

The subject involves a range of activities and participation of the student is critical for achieving the learning outcome of the subject.

The assessment for this task will involve a number of in-class discussion and quizzes relating to content covered during tutorials.

The students will be assessed on their ability to

- Understand and interpret different OSH plans discussed during class and seminars
- Respond appropriately to questions.

7.2 Assignment

7.2.1 Construction Safety Report

The students will be asked to undertake an analysis of the present system of OSH scenario in an ongoing local construction project and will check the compliance of the Codes and guidelines of OSHA of Govt of India. They will also propose ways to improve the existing safety measures in the construction site.

Report format

The report should be presented in A4 format with normal margins of 2.54 cm in each side and the pages numbered. The line spacing should be 1.50 cm. Both sides of the page should be utilized for printing.

Heading, tables, diagrams are to be used and appropriately numbered. An abstract or executive summary at the beginning of the report is to be included (which will include key findings and recommendations). There is no page limit as such for the



report, but it should be approximately 5000 words in length (excluding tables, diagrams and references)

Use of references to existing research/literature in order to support the argument of the report is to be included and properly referenced. The Harvard referencing format (i.e. Author (year)) should be used to cite specific references and all the references should be referred to in a 'References' section at the end of the report.

The students are advised to refer to online skill development courses provided by www.coursera.org to get a better idea of how to put their ideas to words. The following links may be useful for the students

<https://www.coursera.org/learn/business-writing>

<https://www.coursera.org/specializations/academic-english>

Submission – Draft Report

The students are required to submit a draft of their report in week 4. The draft report should, as a minimum be structured and formatted as it is planned to present the final report. As a minimum the student should include a table of contents, type of project selected, identification of client, short description of the project, relevant information about the organisation's recent history, mission and goals, circumstances and problems leading to the currently proposed project work, and stakeholders in the projects.

The Draft Report should not provide any identifying details (name, enrolment number etc) that could be used to identify the student, as the peer review process will be anonymous.

Submit your draft report in printed form properly spiral binded.

7.2.2 Peer Review

Students are required to critically review one of their colleagues' Construction Safety Draft Reports and provide constructive feedback on how the report may be improved. The review should be approximately between 500-1000 words. Primary focus should be on the strengths and weakness of the peer's draft report and how well they address the requirement of developing a detail safety plan for a construction project.



The peer review should focus on making suggestions to help the peer further develop and improve their report.

Peer review assessment criteria

The student will be assessed in his ability to:

- Understand and demonstrate the broad principles of construction safety principles and guidelines.
- Apply that understanding to the analysis and critique of the peer's draft report.
- Critically evaluate the work of peer's and provide constructive feedback.
- To use skill and sensitivity in providing formative (constructive) feedback to peers.

The peer feedback of a draft report of a student will be provided to the student after the completion of the process i.e. by Week 8.

7.2.3 Submission – Final Report

The final report should be submitted in printed form after considering and incorporating the suggestions made in the peer review comments (if any).

Reports submitted after the due date will incur a 10 % penalty of the available marks in that section, unless prior application for special consideration has been submitted and approved.

Final Report Assessment Criteria

The student will be assessed on their ability to

- Identify and critically analyse the prevailing OSH system in a construction site.
- Develop an improved OSH system under the prevailing codes and regulations.
- Suggest and defend ways to improve the existing safety plan.
- Present the report in concise, professional and well-structured manner.
- Respond to peer review.
- Integrate references to relevant literature.
- Provision of appropriate of literature in references.



7.2.4 Final Presentation

The student will present the major findings from his/her final report to the panel members (coordinator and invited reviewers). The ideas that have been identified have to be presented.

Format

The presentation should be addressed to the panel members, as a project proposal for implementation. The student is welcome to present in an own format, but it must be remembered that the format maximizes the exposure to the content of the presentation.

Presentation : 15 minutes followed by Q&A: 5 minutes

Assessment Criteria

The presentation will be assessed by the panel members on the way of presentation and communication skills and how well a student can convince the panel members and taking care of the different components of the designed project.

Presentation date: Week 12.

Students are required to be available for the entire week. The time of presentation will be advised later.

7.3 Marking Scheme: As per University Regulation followed by AEC

Table 2 provides the detailed marking scheme in this subject.



Table 2: Summary of Assessment Tasks and Marking scheme

Assessment category	Brief Discussion	Weight (%)	Pass (%)	To pass, a student has to	
				obtain a minimum marks of	Out of
Class participation	Participation in weekly activities and active involvement in class discussion	10	4	8	20
Assignment 1 (Construction Safety -Draft)	See Below	10	4	8	20
Assignment 2 (Peer Review)	Review of peer report (1000 words)	10	4	8	20
Assignment 3 (Construction Safety -Final)	Professional report outlining as assessment of safety measures and suggestions for improvement. (5000 words)	10	4	8	20
Final Presentation	Presentation of report findings and recommended improvements.	10	4	8	20
End Semester Examination	Theory based.	50	20	40	100
Total	--	100	40	80	200

The students will have to appear in an end semester examination (as per the guidelines of the University under which AEC is affiliated) which will be subjective in nature. A minimum mark of 40% (each assessment category) must be achieved in the examination in order to pass the subject. The assignments/ presentations can be re-submitted in a semester if a student fails to score the requisite pass marks. However, if a student fails to achieve 40 % marks in the theory exam he will be deemed to fail in the subject and will have to clear in the next attempt.



8.0 REQUIRED READING

Students are expected to refer various construction safety and OSHA related topics from various sources, which might include case studies, conferences papers, library collections, eBooks and e Journals. A list of reading materials is provided in Table – 3, Section 12.

9.0 REQUIRED TEXTS

- Rita Yi Man Li, Construction Safety Informatics, ISBN 978-981-13-5760-2 ISBN 978-981-13-5761-9, <https://doi.org/10.1007/978-981-13-5761-9>, © Springer Nature Singapore Pte Ltd. 2019.
- Rita Yi Man Li, An Economic Analysis on Automated Construction Safety, Internet of Things, Artificial Intelligence and 3D Printing, ISBN 978-981-10-5770-0 ISBN 978-981-10-5771-7, DOI 10.1007/978-981-10-5771-7, © Springer Nature Singapore Pte Ltd. 2018.
- Construction Safety and Waste Management-An Economic Analysis, Rita Yi Man Li, Department of Economics and Finance /Sustainable Real Estate Research Center, Hong Kong Shue Yan University, Hong Kong, China. Springer International Publishing Switzerland 2015.
- www.elcosh.org/index.php for accessing electronic library for construction OSH

10.0 ATTENDANCE POLICY

The attendance policy is as per the standard university guidelines (under which AEC is affiliated).

11.0 PLAGIARISM, COLLUSION AND CONSEQUENCES

Merriam-Webster's online dictionary explains that **Plagiarism** is the act of stealing and passing off (the ideas or words of another) as one's own; or using another's



production without crediting the source; or to commit literary theft i.e. to present as new and original an idea or product derived from an existing source.

Collusion is the presentation by a student of an assignment as his or her own which is in fact the result in whole or part of unauthorized collaboration with another person or persons.

In any case where a student has been involved in plagiarism or collusion in an assessable assignment on task the marks awarded for that will be zero, and no substitution of an alternative task will normally be permitted.

12.0 READING LIST

The reading list (as provided in Table 3) provides the literature that a student is expected to go through to understand the various state of practice in the field of Construction Safety. However this list is not an extensive one and may be updated and altered as and when necessary. Students are encouraged to come up with suggested literature in this field for discussion in or off the class.

Table 3: Reading List

Reading	Lecture	Suggested Literature
CS-1-1	Lecture 1	Guidelines on occupational safety and health management systems, International Labour Office (ILO) Geneva, Copyright © International Labour Organization Second edition, PCL Presses Centrales SA, 2009
CS-1-2		INTRODUCTION TO OSHA, Slide-Share
CS-1-3		All About OSHA, Occupational Safety and Health Administration, US Department of Labour, www.osha.gov
CS-1-4		Recommended Practices for Safety & Health Programs in Construction, OSHA-Occupational Safety and Health Administration www.osha.gov , pp 2-14, October 2016
CS-2-1	Lecture 2	Recommended Practices for Safety and Health Programs Crosswalk to Existing OSHA Standards, U.S. Department of Labor, www.osha.gov , (800) 321-OSHA (6742)



Reading	Lecture	Suggested Literature
CS-2-2		Recommended Practices for Safety and Health Programs Voluntary Standards Crosswalk, U.S. Department of Labor, www.osha.gov , (800) 321-OSHA (6742)
CS-2-3		Safety Management in Construction Industry, pp 55-77, Slideshare, Norrazman Zaihabin Zainol, Email: razman.pe@gmail.com
CS-2-4		R. Y. M. Li and S. W. Poon, Supply of Safety Measures in Developing and Developed Countries: A Global Perspective, Construction Safety, Risk Engineering, DOI: 10.1007/978-3-642-35046-7_3, Springer-Verlag Berlin Heidelberg 2013
CS-2-5		Construction work Code of Practice, Safe Work Australia info@swa.gov.au www.swa.gov.au , ISBN 978-0-642-33361-2 (PDF)
CS-3-1	Lecture 3	Elements of OSH Framework in India, Slideshare
CS-3-2		Safety Control in the Construction Industry In India, Slideshare, RameshA. Bagi, Corporate Asst Gen. Manager Occupational Health, Safety & Environment Godrej & Boyce Mfg. Co. Ltd
CS-3-3		National Policy on Safety, Health and Environment at Work Place, Government of India Ministry of Labour and Employment
CS-3-4		LIST OF IMPORTANT INDIAN STANDARDS ON SAFETY & HEALTH
CS-3-5		https://www.ilo.org/safework/countries/lang--en/index.htm for Country profiles on occupational safety and health https://www.slideshare.net/BimalChandraDas/isi-safety-code-pdf for construction safety codes in india https://archive.india.gov.in/business/legal_aspects/occupational.php for key regulations of OSH in India
CS-4-1	Lecture 4	Workers Safety Series: Construction, OSHA Pocket Guide, OSHA 3252-05N, www.osha.gov , 2005.
CS-4-2		Safety Handbook for Construction Site Workers, Occupational Safety and Health Branch Labour Department, http://www.labour.gov.hk/eng/public/b69.htm



Reading	Lecture	Suggested Literature
CS-5-1	Lecture 5	Safety Management in Construction Industry, pp 14-29 and pp 91-203, Slideshare, Norrazman Zaihabin Zainol, Email: razman.pe@gmail.com
CS-5-2		Recommended Practices for Safety & Health Programs in Construction, OSHA-Occupational Safety and Health Administration www.osha.gov , October 2016
CWM-6-1	Lecture 6	Workers Safety Series: Construction, OSHA Pocket Guide, OSHA 3252-05N, www.osha.gov , 2005.
CWM-6-2		Rita Yi Man Li, Daniel Chi Wing, Beiqi Tang, Factors Which Affect Construction Safety in Different Types of Construction Work, © Springer International Publishing AG 2018 P. Arezes (ed.), Advances in Safety Management and Human Factors, Advances in Intelligent Systems and Computing 604, DOI 10.1007/978-3-319-60525-8-8
CS-6-3		For additional resources: https://www.osha.gov/shpguidelines/additional-resources.html#hazId
CS-7-1	Lecture 7	Pre-construction OSH Planning, Slideshare, Jainul Rashid Murad
CS-7-2		Recommended Practices for Safety & Health Programs in Construction, OSHA-Occupational Safety and Health Administration www.osha.gov , October 2016, pp 15-19.
CS-7-3		Safety Management in Construction Industry, pp 34-38, Slideshare, Norrazman Zaihabin Zainol, Email: razman.pe@gmail.com
CS-8-1	Lecture 8	S. Ajith, C. Sivapragasam, V. Arumugaprabu, Quantification of risk and assessment of key safety factors for safe workplace in Indian building construction sites, Asian Journal of Civil Engineering, Springer Nature Switzerland AG, https://doi.org/10.1007/s42107-019-00136-y , 2019.
CS-8-2		Selvam A, Krithika Priyadarshini, Safety Management and Hazards Control Measures in Construction, IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684, p-ISSN: 2320-334X. PP 97-101, www.iosrjournals.org
CS-8-3		For additional resources: https://www.osha.gov/shpguidelines/additional-resources.html#hazId
CS-9-1	Lecture 9	Protecting Construction Workers in Confined Spaces:



Reading	Lecture	Suggested Literature
		Small Entity Compliance Guide, U.S. Department of Labor Occupational Safety and Health Administration, OSHA 3825-09, 2015
CS-9-2		Confined Spaces in Residential Construction, OSHA fact sheet
CS-10-1		Occupational Health and Safety Regulations, Victorian Legislation (2007) Version No. 001, S.R. No. 54/2007, Version as at 1 July 2007
CS-10-2	Lecture 10	Steven Jerie (2016) Occupational Risks Associated with Solid Waste Management in the Informal Sector of Gweru, Zimbabwe. Journal of Environmental and Public Health Volume 2016, Article ID 9024160, Pp1-14
CS-11-1		Recommended Practices for Safety & Health Programs in Construction, OSHA-Occupational Safety and Health Administration www.osha.gov , October 2016, pp 20-23.
CS-11-2	Lecture 11	Safety Management in Construction Industry, pp 39-50, Slideshare, Norrazman Zaihabin Zainol, Email: razman.pe@gmail.com
CS-12-1		Construction Site Safety Handbook, Published by The Real Estate Developers Association of Hong Kong and The Hong Kong Construction Association, 2005.
CS-12-2		R. Y. M. Li and S. W. Poon, Effectiveness of Safety Measures in Reducing Construction Accident Rates, Construction Safety, Risk Engineering, DOI: 10.1007/978-3-642-35046-74, Springer-Verlag Berlin Heidelberg 2013.
CS-12-3		For additional resources: https://www.osha.gov/shpguidelines/additional-resources.html#hazld
CS-13-1		All About OSHA, Occupational Safety and Health Administration, US Department of Labour, pp 14-18, www.osha.gov
CS-13-2	Lecture 13	Safety and health program self-evaluation tool format
CS-13-3		Safety and health program audit tool format
CS-14-1	Lecture 14	Recommended Practices for Safety & Health Programs in Construction, OSHA-Occupational Safety and Health Administration www.osha.gov , October 2016, pp 27-29.



Reading	Lecture	Suggested Literature
CS-14-2		Guidelines on occupational safety and health management systems, International Labour Office (ILO) Geneva, Copyright © International Labour Organization Second edition, PCL Presses Centrales SA, pp 13-17, 2009
CS-14-3		Safety and health program implementation checklist
CS-14-4		https://www.osha.gov/shpguidelines/ For additional resources: https://www.osha.gov/shpguidelines/additional-resources.html#hazld
CS-15-1	Lecture 15	Recommended Practices for Safety & Health Programs in Construction, OSHA-Occupational Safety and Health Administration www.osha.gov , October 2016, pp 24-26.
CS-15-2		Training Requirements in OSHA Standards, OSHA 2254-09R 2015, Occupational Safety and Health Administration www.osha.gov .
CS-15-3		Recommended Practices for Anti-Retaliation Programs, www.whistleblowers.gov (800) 321-OSHA (6742) OSHA 3905-01/2017.
CS-16-1	Lecture 16	Safety Plan Template for a Construction Company
CS-16-2		https://www.osha.gov/dts/osta/oshasoft/ for eTools and the eMatrix are "stand-alone," interactive, Web-based training tools on occupational safety and health topics. They are highly illustrated and utilize graphical menus. For additional resources: https://www.osha.gov/shpguidelines/additional-resources.html#hazld
CS-17-1	Lecture 17	Workers' Rights, Occupational Safety and Health Administration, US Department of Labour, OSHA 3021-06R 2017
CS-17-2		All About OSHA, Occupational Safety and Health Administration, US Department of Labour, pp 9-10, www.osha.gov
CS-17-3		Recommended Practices for Protecting Temporary Workers, 1-800-CDC-INFO (1-800-232-4636) www.cdc.gov/niosh , 1-800-321-OSHA (6742)
CS-18-1		Recommended Practices for Anti-Retaliation Programs, www.whistleblowers.gov (800) 321-OSHA (6742) OSHA 3905-01/2017.



Reading	Lecture	Suggested Literature
CS18-2	Lecture 18	https://www.osha.gov/as/opa/worker/employer-responsibility.html for Employers responsibility https://www.osha.gov/workers/file_complaint.html for filing a complain https://www.shrm.org/resourcesandtools/legal-and-compliance/employment-law/pages/india-construction.aspx for workers rights in construction safety in India
CS-19-1	Lecture 19	Rita Yi Man Li, An Economic Analysis on Automated Construction Safety, Internet of Things, Artificial Intelligence and 3D Printing, ISBN 978-981-10-5770-0 ISBN 978-981-10-5771-7 (eBook) DOI 10.1007/978-981-10-5771-7, © Springer Nature Singapore Pte Ltd. 2018.
CS-19-2		Ali Karakhan, Yiye Xu, Chukwuma Nnaji, and Ola Alsaffar, Technology Alternatives for Workplace Safety Risk Mitigation in Construction: Exploratory Study, © Springer Nature Switzerland AG I. Mutis and T. Hartmann (eds.), Advances in Informatics and Computing in Civil and Construction Engineering, https://doi.org/10.1007/978-3-030-00220-6_99 , pp 823-829, 2019.
CS-19-3		Hyeonwoo Seong, Hyojoo Son, Changwan Kim, A Comparative Study of Machine Learning Classification for Color-based Safety Vest Detection on Construction-Site Images, KSCE Journal of Civil Engineering, 22(11):4254-4262 Copyright ©2018 Korean Society of Civil Engineers DOI 10.1007/s12205-017-1730-3, 2018.
CS-20-1	Lecture 20	Quang Tuan Le·Akeem Pedro·Chan Sik Park, A Social Virtual Reality Based Construction Safety Education System for Experiential Learning, J Intell Robot Syst (2015) 79:487–506 DOI 10.1007/s10846-014-0112-z, Springer.
CS-20-2		https://www.osha.gov/dts/osta/oshasoft/ for eTools and the eMatrix are "stand-alone," interactive, Web-based training tools on occupational safety and health topics. They are highly illustrated and utilize graphical menus.



Reading	Lecture	Suggested Literature
CS-21-1	Lecture 21	Ibrahim Mosly, The Integration of Worker Safety and Health into Sustainable Construction Practices: A Review, Springer International Publishing Switzerland, P. Arezes (ed.), Advances in Safety Management and Human Factors, Advances in Intelligent Systems and Computing 491, DOI 10.1007/978-3-319-41929-9_21, 2016.
CS-21-2		Bon-Gang Hwang, Ming Shan and Siong Leng Phuah, Safety in Green Building Construction Projects in Singapore: Performance, Critical Issues, and Improvement Solutions, KSCE Journal of Civil Engineering 22(2):447-458 Copyright ©2018 Korean Society of Civil Engineers DOI 10.1007/s12205-017-1961-3, 2018.
CS-22-1	Lecture 22	National Occupational Safety and Health (OSH) Profile, Prepared by: Directorate General Factory Advice Service and Labour Institutes in collaboration with International Labour Organization (ILO)
CS-22-2		Shyam Pingle, Occupational Safety and Health in India: Now and the Future, Industrial Health, 50, pp 167-171, 2012.
CS-22-3		Karan Singh, Safety in Indian Construction, International Journal of Engineering Research & Technology (IJERT), Vol. 3 Issue 11, pp 1564-1566, 2014
CS-22-4		M.M.K. Sardana, Health and Safety at Workplaces in India, ISID Discussion Notes.
CS-23-1	Lecture 23	R. Y. M. Li and S. W. Poon, Case Studies on Safety Measures Implementation, Construction Safety, Risk Engineering, DOI: 10.1007/978-3-642-35046-7_6, Springer-Verlag Berlin Heidelberg, pp 65-80, 2013
CS-23-2		Afzan Binti Ahmad Zaini, Intan Rohani Endut and Nurzawani Binti Md Sofwan, A Review in Developing a High Rise Building Construction Safety and Health Risk Model, Springer Science and Business Media Singapore, pp 253-262, 2015
CS-23-3		Hafiz Zahoor, Albert P.C. Chan, Faisal Arain, Ran Gao, Wahyudi P. Utama, An Analytical Review of Occupational Safety Research in Pakistan Construction Industry, International Journal of Construction Project Management ISSN: 1944-1436 Volume 8, Number 2, Nova Science Publishers, pp 125-140, 2016.



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For any query please don't hesitate to contact me over email.

The study materials for the entire subject have been developed and will be available electronically.

