Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2021-22

Course Information

Programme	M. Tech. Civil (Environmental Engineering)
Class, Semester	First Year M. Tech., Semester III
Course Code	5EV651
Course Name	Mini Project 6: Operation and Maintenance of Environmental Facilities
Desired Requisites:	Operation and Maintenance of Environmental Facilities

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**LA4**	**Total**
Tutorial	-	30	30	40	100
Practical	2				
Interaction	-	**Credits: 1**			

Course Objectives

1	Provide in-depth knowledge of operation and maintenance of infrastructural facilities in environmental engineering.
2	To enhance the technical competency and apply the acquired knowledge for research and development, industry, and consultancy activities.

Course Outcomes (CO) with Bloom's Taxonomy Level

CO1	***Explain*** concepts of operation and maintenance for environmental facilities.	Understand
CO2	***Apply*** the imparted knowledge to effectively operate the system.	Apply
CO3	***Assess*** operation and maintenance problems associated with real life environmental facility.	Evaluate

List of Experiments / Lab Activities

Real life Project

Study of operation and maintenance requirement, procedure, manuals, inspection methods, safety procedures etc. by a group of students (preferably 3-4 students) for at least one of the following facilities and prepare a detailed report

a. Water Treatment Plant (WTP)
b. Sewage Treatment Plant (STP)
c. Common Effluent Treatment Plant (CETP)
d. Industrial Wastewater Treatment Plant
e. Water Distribution System (WDS)
f. Sewerage System

Text Books

1	Quasim S. R., Motley E. M. and Zhu G., "Water works engineering", PHI learning private limited, 2000.
2	Wark K. And Warner C.F., "Air Pollution", H.R. Publication, 1st Edition, 1978.

References	
1	"Manual on water supply and Treatment", CPHEEO, Ministry of Urban Development, Govt. ofIndia, New Delhi, 1999.
2	"Manual on Sewerage and Sewage Treatment", CPHEEO, Ministry of Urban Development, Govt. of India, New Delhi, 1993.
Useful Links	
1	https://www.suezwaterhandbook.com/processes-and-technologies/instrumentation-control-regulation/deferred-plant-control-system/water-treatment-plant-maintenance
2	https://www.epa.gov/sites/production/files/2018-07/documents/uss-midwest-revised-om-pmpp-manual-submitted-20180626-184pp.pdf

CO-PO Mapping						
	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1			2	3		
CO2			2	2		
CO3			2	1		

Assessment				
There are three components of lab assessment, LA1, LA2 and ESE				
Assessment	**Based on**	**Conducted by**	**Typical Schedule**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 5 Marks Submission at the end of Week 5	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 6 to Week 10 Marks Submission at the end of Week 9	30
ESE	Lab Performance and documentation	Lab Course Faculty	During Week 10 to Week 15 Marks Submission at the end of Week 15	40
Week 1 indicates starting week of Semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.				

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**LA1**	**LA2**	**ESE**	**Total**
Remember				
Understand	10	10	10	**30**
Apply	10	10	10	**30**
Analyse				
Evaluate	10	10	20	**40**
Create				
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli

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AY 2021-22

Course Information	
Programme	M. Tech. Civil (Environmental Engineering)
Class, Semester	Second Year M. Tech., Semester III
Course Code	5EV652
Course Name	Mini Project 6: Project Management
Desired Requisites	Project Management

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**LA4**	**Total**
Tutorial	-	30	30	40	100
Practical	2				
Interaction	-	**Credits: 1**			

Course Objectives	
1	To solve problems for scheduling and resource smoothening for small projects
2	To teach the skills of presentation and documentation for a project

Course Outcomes (CO) with Bloom's Taxonomy Level	
CO1	***Conceive*** and characterise any project
CO2	***Apply*** the WBS and scheduling concepts for Time managements of projects
CO3	***Examine*** a project proposal and ***justify*** its appropriateness.

List of project works

1. Selection of a project
2. Identifying activities
3. Performing WBS
4. Scheduling timelines
5. Exercising on Time and Cost balancing.
6. Cost Estimate of the project
7. Preparing the complete Project Proposal.

Text Books	
1	Jack Gido, James P Clements, *Project Management,* Cengage Learning India Pvt. Ltd., 2nd Reprint 2011, ©2007
2	B.C. Punmia and Khandelwal, *Project Planning and Control with PERT and CPM*, Lakshmi Publications Pvt. Ltd., 4th Edition, 2008

References	
1	**A guide to the Project Management Body of Knowledge (PMBOK guide), October 2017** by Project Management Institute.

CO-PO Mapping						
	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1	2					2
CO2	2					
CO3					3	

Assessment				
There are three components of lab assessment, LA1, LA2 and ESE				
Assessment	**Based on**	**Conducted by**	**Typical Schedule**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 5 Marks Submission at the end of Week 5	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 6 to Week 10 Marks Submission at the end of Week 9	30
ESE	Lab Performance and documentation	Lab Course Faculty	During Week 10 to Week 15 Marks Submission at the end of Week 15	40
Week 1 indicates starting week of Semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.				

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**LA1**	**LA2**	**ESE**	**Total**
Remember				
Understand				
Apply				
Analyse				
Evaluate				
Create				
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli

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AY 2021-22

Course Information	
Programme	M. Tech. Civil (Environmental Engineering)
Class, Semester	Second Year M. Tech., Semester III
Course Code	5EV611
Course Name	Operation and Maintenance of Environmental Facilities
Desired Requisites:	Courses on Water and Wastewater Treatment, Air pollution, Solid Waste Management

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	2 Hrs./week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 2**			

Course Objectives	
1	Provide in-depth knowledge of operation and maintenance of infrastructural facilities in environmental engineering.
2	To enhance the technical competency and apply the acquired knowledge for research and development, industry, and consultancy activities.

Course Outcomes (CO) with Bloom's Taxonomy Level		
CO1	***Explain*** concepts of operation and maintenance for environmental facilities.	Understand
CO2	***Apply*** the imparted knowledge to effectively operate the system.	Apply
CO3	***Assess*** operation and maintenance problems associated with real life environmental facility.	Evaluate

Module	**Module Contents**	**Hours**
I	**Introduction** Need of Operation and Maintenance (O & M), Basic principles, corrective and preventive maintenance, Detailed plans, drawings, operation manuals, computer usage in O and M.	5
II	**Water Supply System** Intakes, pumps, transmission pipes, water treatment process control, Quantity and quality monitoring.	4
III	**Water Distribution and Sewerage System** *Water distribution system*: Loss of carrying capacity of pipes, pipe breaks and leakages, leak detection, record keeping, O and M of Appurtenances, Use of network models in O and M, Corrosion control. *Sewerage system*: Maintenance, Inspection methods, Manual and television, Cleaning and rehabilitation, Safety in sewer inspection.	5
IV	**Wastewater Treatment Plant** Wastewater treatment plant: O and M of wastewater treatment plant, Monitoring and operational problems, Corrective measures. Performance:	5

	Plant performance, Need for up gradation, Process reliability, Odour management.	
V	**Air Pollution Control Facilities** Air pollution control facilities: Regular inspection of devices, SPM control equipment, Gravity settlers, Cyclone separators, Bag filters, Scrubbers, Electrostatic precipitator, Gaseous control devices, incinerators and their trouble shooting.	5
VI	**Planning and Management** Organizational structure, work planning, preparation and scheduling, Cost estimates.	4
Text Books		
1	Quasim S. R., Motley E. M. and Zhu G., "Water works engineering", PHI learning private limited, 2000.	
2	Wark K. And Warner C.F., "Air Pollution", H.R. Publication, 1st Edition, 1978.	
References		
1	"Manual on water supply and Treatment", CPHEEO, Ministry of Urban Development, Govt. ofIndia, New Delhi, 1999.	
2	"Manual on Sewerage and Sewage Treatment", CPHEEO, Ministry of Urban Development, Govt. of India, New Delhi, 1993.	
Useful Links		
1	https://www.youtube.com/watch?v=Kc9u3I0tyeg	
2	https://www.suezwaterhandbook.com/processes-and-technologies/instrumentation-control-regulation/deferred-plant-control-system/water-treatment-plant-maintenance	
3	https://www.epa.gov/sites/production/files/2018-07/documents/uss-midwest-revised-om-pmpp-manual-submitted-20180626-184pp.pdf	

CO-PO Mapping						
	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1			3			
CO2			3			
CO3						2

Assessment
The assessment is based on 2 Tests (T1 & T2) of 20 marks each, and 1 end-semester examination (ESE) of 60 marks. Test 1 is typically based on the modules 1 & 2. Test 2 is based on modules 3 & 4 and ESE is based on all modules with 40-50% weightage on modules 1 to 4 and 50-60% weightage on modules 5 & 6.

Bloom's Taxonomy Level	**T1**	**T2**	**ESE**	**Total**
Remember				
Understand	10		20	**30**
Apply	10	10	20	**40**

Analyze				
Evaluate		10	20	**30**
Create				
Total	**20**	**20**	**60**	**100**

Walchand College of Engineering, Sangli *(Government Aided Autonomous Institute)*					
AY 2020-21					
Course Information					
Programme	M. Tech. Civil (Environmental Engineering)				
Class, Semester	Second Year M. Tech., Semester III				
Course Code	5EV612				
Course Name	Project Management				
Desired Requisites:	Nil				
Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	2 Hrs./week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 2**			

Course Objectives	
1	To develop a holistic, integrated approach to manage projects, exploring both technical and managerial challenges in environmental / structural engineering projects.
2	To inculcate leadership, and ethical qualities in dealing with real life project environment and develop positive attitude towards individual responsbility in project execution.
3	To induce qualities for supporting industry's life-long learning programs, working in interdisciplinary and cross functional teams with effective communication skills and managerial challenges.

Course Outcomes (CO) with Bloom's Taxonomy Level		
CO1	***Perceive*** critically the project characteristics, project management principles and ***apply*** them in the context to real world problems.	Apply
CO2	***Formulate*** and ***solve*** projects in context of scheduling and controlling with time and cost as constraints using the imparted knowledge of network scheduling techniques and applications using software.	Apply
CO3	***Demonstrate*** leadership skills and communicate effectively in convincing various stakeholders to accomplish project objectives ethically.	Apply

Module	**Module Contents**	**Hours**
I	**Project Management Concepts** Factors Governing Modern Business, Effective Project Management, definition of project, Attributes of Project, Strategic Planning, Project Life Cycle, , Project Process, Project Balancing, Project Environment, Programme and Portfolio.	5
II	**Project Planning and Schedule** WBS, Responsibility matrix, Devp. of non-network and network schedules, Activity duration estimates, Schedule calculations, Probability considerations.	8
III	**Schedule control** Project control process Updating schedule, Approaches to schedule control, Resource considerations.	4

IV	**Cost Planning and Performance** Project cost estimates, Budget, Actual cost, Cost Forecasting, Least-Cost Schedules	4
V	**Project Manager and Project Team** Responsibilities and skills, Delegation, Leadership, Devp. and effectiveness of project team, SWOT analysis.	4
VI	**Project communication and Documentation** Personal communication, Meeting, Presentations and Report preparation,	4

Text Books	
1	Jack Gido, James P Clements, *Project Management,* Cengage Learning India Pvt. Ltd., 2nd Reprint 2011, ©2007
2	A guide to the Project Management Body of Knowledge (PMBOK guide), October 2017 by Project Management Institute.

References	
1	John Adair, Strategic Leadership, Kogan Page Ltd., 1st ed. 2010.
2	Project Management, Achieving Competitive Advantage, Jeffrey K. Pinto, Dorling Kindersley India Pvt. Ltd. Ed. 2009.
3	B.C. Punmia and Khandelwal, *Project Planning and Control with PERT and CPM*, Lakshmi Publications Pvt. Ltd., 4th Edition, 2008
4	K. Nagarajan, *Project Management*, New Age Int., 2nd ed. 2004.

Useful Links	
1	http://nptel.ac.in
2	http://www.nptelvideos.in

CO-PO Mapping						
	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1						3
CO2		2			2	
CO3		3			3	

Assessment
The assessment is based on 2 Tests (T1 & T2) of 20 marks each, and 1 end-semester examination (ESE) of 60 marks. Test 1 is typically based on the modules 1 & 2. Test 2 is based on modules 3 & 4 and ESE is based on all modules with 40-50% weightage on modules 1 to 4 and 50-60% weightage on modules 5 & 6.

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**T1**	**T2**	**ESE**	**Total**
Remember				
Understand				
Apply	20	20	60	**100**
Analyze				
Evaluate				
Create				
Total	**20**	**20**	**60**	**100**

Walchand College of Engineering, Sangli

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AY 2021-22

Course Information	
Programme	M. Tech. Civil (Environmental Engineering)
Class, Semester	Second Year M. Tech., Semester IV
Course Code	5EV622
Course Name	Emerging Technologies in Water and Wastewater Treatment
Desired Requisites:	A course on Water and Wastewater Treatment at graduate level and Physico-Chemical Methods for Water and Wastewater Treatment

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs./week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives	
1	Provide in-depth knowledge of emergent technologies in water and wastewater engineering.
2	To enhance the technical competency and apply the acquired knowledge for research and development, industry, and consultancy activities.

Course Outcomes (CO) with Bloom's Taxonomy Level		
CO1	***Explain*** and ***apply*** the concepts of emerging/advanced physical, chemical and biological processes for the treatment of water and wastewater.	Understand Apply
CO2	***Analyze*** and ***evaluate*** the emerging/advanced physical, chemical and biological systems for the treatment of water and wastewater.	Analyze Evaluate
CO3	***Design*** the emerging/advanced physical, chemical and biological water and wastewater treatment facilities.	Create

Module	**Module Contents**	**Hours**
I	**Solids Separation** High rate clarification, Enhanced particle flocculation, Analysis of ballasted flocculation and settling, Dense-sludge process, Swirl and vortex separation, Enhanced coagulation, Applications in water and wastewater treatment	5
II	**Organic and Inorganic Matter Removal** *Organic matter removal:* Chemical oxidation for BOD, COD, ammonia and non-biodegradable organic compounds, Advanced oxidation processes. *Inorganics removal:* Biological removal of phosphorous, heavy metals, toxic and recalcitrant organic compounds, Biological-Chemical Phosphorus and Nitrogen Removal (BCFS) Process Gas Stripping for ammonia and VOC removal, analysis, design of stripping towers	5
III	**Hybrid Treatment** Biological treatment with membrane separation, Combined aerobic treatment processes, Integrated Fixed-film Activated Sludge (IFAS) Systems, Aerobic granular biomass wastewater treatment, Submerged attached growth processes, Denitrification with attached growth systems, Moving bed	10+2

	bioreactor, Combination natural and mechanized treatment systems, Vertical flow constructed wetland, Aerated constructed wetland	
IV	**Decentralized and Sustainable Wastewater Treatment** *Sustainable wastewater treatment:* Limitations of conventional centralized wastewater systems, Concept of sustainability in wastewater treatment. *Decentralized treatment:* Concept, significance, applications and elements of decentralized wastewater treatment, Technologies for Decentralized wastewater treatment, On-site treatment systems, Greywater treatment.	8
V	**Vermin Technology** Vermin technology: Concept, Worm species, Worm action. *Applications of vermin technology:* Vermifilter and Vegetated vermifilter in biological treatment of wastewater, Vermi-stabilization of sludge, Vermin composting.	6
VI	**Introduction to Automation and Nano Technology** Introduction to automatic process control, Energy efficiency in wastewater treatment, Upgrading wastewater treatment plant performance. *Nano technology in treatment:* Introduction to Nano technology in water and wastewater treatment, Drinking water decontamination using Nano technology, Application of Nano TiO2 catalyst in wastewater treatment, Disinfection by Nano particles.	6
Text Books		
1	Peavy H, S, Rowe D, R, and Tchobanoglous G, "Environmental Engineering", McGraw-Hill Book Company, Indian edition 2017.	
2	Hammer M. J. and Hammer M. J., "Water and Wastewater Technology", PHI learning private limited, 6th Edition, 2008.	
3	Metcalf and Eddy "Wastewater Engineering Treatment and Reuse", Tata McGraw Hill Publication, 6th Reprint, 2003.	
References		
1	Sincero A. P. and Sincero G. A., "Environmental Engineering A Design approach", PHI learning private limited, 2004.	
2	Nazaroff W. W. and Alvarwz-Cohen, "Environmental Engineering Science", John Wiley & Sons Publication, 2011.	
3	Ram M. K., Andreescu S. and Ding H., "Nanotechnology for Environmental decontamination", McGraw Hill, 2011.	
Useful Links		
1	https://www.epa.gov/sites/production/files/2019-02/documents/emerging-tech-wastewater-treatment-management.pdf	
2	https://www.intechopen.com/online-first/emerging-trends-in-wastewater-treatment-technologies-the-current-perspective	

CO-PO Mapping						
	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1			3			

CO2				3		
CO3						3

Assessment
The assessment is based on 2 Tests (T1 & T2) of 20 marks each, and 1 end-semester examination (ESE) of 60 marks. Test 1 is typically based on the modules 1 & 2. Test 2 is based on modules 3 & 4 and ESE is based on all modules with 40-50% weightage on modules 1 to 4 and 50-60% weightage on modules 5 & 6.

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**T1**	**T2**	**ESE**	**Total**
Remember				
Understand	10	5	10	**25**
Apply	5	5	10	**20**
Analyze	5	5	10	**20**
Evaluate		5	15	**20**
Create			15	**15**
Total	**20**	**20**	**60**	**100**

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2021-22

Course Information	
Programme	M. Tech. Civil (Environmental Engineering)
Class, Semester	Second Year M. Tech., Semester IV
Course Code	5EV621
Course Name	Industrial Wastewater Pollution and Control
Desired Requisites:	A course on Wastewater Treatment at graduate level and Physico-Chemical Methods for Water and Wastewater Treatment

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs./week	**T1**	**T2**	**ESE**	**Total**
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives	
1	To provide conceptual and field knowledge for the analysis, design and evaluation of biological processes of wastewater treatment.
2	To enhance the technical competency to conduct research and address the problems of industry/society related to wastewater treatment.
3	To inculcate the qualities of critical thinking.

Course Outcomes (CO) with Bloom's Taxonomy Level		
CO1	***Explain*** and ***apply*** concepts of industrial wastewater treatment	Understand Apply
CO2	***Analyze*** and ***evaluate*** the physical and chemical treatment systems used in water and wastewater	Analyze Evaluate
CO3	***Design*** physical and chemical treatment systems for water and wastewater	Create

Module	**Module Contents**	**Hours**
I	**Classification of Industries and Cooling Tower** Classification of Industries, General water requirements in industry, Industrial water reuse, Cooling tower make up water, Water and salt balances in cooling tower, Common water quality problems in cooling water tower systems, Estimation of blow-down water composition, Analysis of scaling potential by Langlier and Ryzner indices	4
II	**Waste Minimization Techniques** Waste audit, Concept of waste minimization and Techniques of volume and strength reduction. Equalization: Process, Flow and quality, Location, Volume requirement and Design considerations. Reuse and recycling concepts, Process description, Objectives and Methods of Neutralization and Proportioning.	5
III	**Agro Based Industries** Manufacturing processes, Water usage, Sources, Quantities and characteristics of effluents (process stream and combined), Pollution effects, Waste	12

	Reduction/ Reclamation/By-product recovery, Utilization, Alternative methods of treatment and disposal for Agro-based industries: Sugar, Distillery, Dairy, Pulp and paper mill and Textile	
IV	**Chemical and Engineering Industries** Manufacturing processes, Water usage, Sources, Quantities and characteristics of effluents (process stream and combined), Pollution effects, Waste Reduction /Reclamation/By-product recovery, Utilization, Alternative methods of treatment and disposal for a. Chemical industries: Pharmaceutical, Petroleum and refineries, Fertilizer and Tannery b. Engineering industries: Steel, Electroplating, Foundries c. Thermal power plants	12
V	**Common Effluent Treatment Plant** Concept, Objectives, Methodology, Cost benefit analysis, Design, Operation and maintenance	4
VI	**Detailed Project Report for Waste Treatment Facilities** Project report preparation for waste treatment and disposal system of industries, Pre-feasibility, feasibility and detailed project reports, Project financial appraisal	3
Text Books		
1	Peavy H, S, Rowe D, R, and Tchobanoglous G, "Environmental Engineering", McGraw-Hill Book Company, Indian edition 2017.	
2	Metcalf and Eddy "Wastewater Engineering Treatment and Reuse", Tata McGraw Hill Publication, Indian Edition 2017.	
3	Unit Operations and Processes in Environmental Engineering, 2nd Edition, by Tom D. Reynolds and Paul A. Richards, PWS Publishing Company, 1995.	
References		
1	Droste, Ronald L "Theory and Practice of Water and Wastewater Treatment", Wiley student Edition, 2009.	
2	Crites Ron and Tchobanoglous George, "Small and Decentralized Wastewater Management Systems", McGraw-Hill Book Company, International edition, 1998.	
3	Sincero A, P and Sincero G, A, "Environmental Engineering A Design approach", PHI learning private limited, 2004.	
4	Quasim, S. R., "Wastewater treatment plants planning, design and operation", CRC Press, 2nd Edition, 2010.	
Useful Links		
1	https://www.youtube.com/watch?v=in3GSRuooRs&t=3s	
2	https://www.youtube.com/watch?v=JBSP6ayaIjU&t=9s	

CO-PO Mapping						
	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1			2			
CO2				3		
CO3				2		3

Assessment
The assessment is based on 2 Tests (T1 & T2) of 20 marks each, and 1 end-semester examination (ESE) of 60 marks. Test 1 is typically based on the modules 1 & 2. Test 2 is based on modules 3 & 4 and ESE is based on all modules with 40-50% weightage on modules 1 to 4 and 50-60% weightage on modules 5 & 6.

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	**ISE1**	**MSE**	**ESE**	**Total**
Remember				
Understand	10	5	10	**25**
Apply	5	5	10	**20**
Analyze	5	5	10	**20**
Evaluate		5	15	**20**
Create			15	**15**
Total	**20**	**20**	**60**	**100**