Appendix 6: College of Science and Technology

Appendix 6.1: Module Plans

Appendix 6.1.1 Earthquake Engineering

Module Code: C 88

Semester: VIII (B.E- IV Year)

Credit Value: 12

Module Tutor: X

General objectives or aims of the module:

The goal of this course is to introduce students to earthquake engineering studies as per the module descriptor and familiarize them to IS codes related to it. Also earthquake analysis and design for engineering structures like buildings and shear walls.

Topics

1. Elements of Seismology: Definitions of Magnitude, Intensity, Epicenter etc., General features of tectonic of seismic regions, Seismographs.

2. Theory of Vibration: Free Vibration of single degree, two degree and multiple degree freedom systems. Computation of dynamic response to time dependent forces. Vibration absorbers.

3. Principles of Earthquake Resistant Design: Response spectrums theory. Brief introduction to accerographs and SRR.'s. Nature of dynamic loading resulting from earthquakes. Application of Response spectrum theory to a seismic design of structures. Resistance of structural elements and structures for dynamic loads, design criteria-strength and deflection. Ductility and absorption of energy.

4. Dynamic properties of soils

5. Earthquake resistance design of structures: building design and shear walls.

6. Introduction to Indian Standard Codes: IS:1893-1984 and IS: 4326-1993

Methodology

Lectures: 3 hours/week

Tutorial: 1 hour/week

Self directed learning: 6 hours/week

Reading material

Arya, A.S., ed., "Earthquake Engineering", Jai Krishna 60th Birthday Anniversary Commemoration Volume, ISET, Sarita Prakashan ,Meerut, 1974.

Dowrick, D.J.,"Earthquqke Resistant Design ",John-Wiley and sons, London,1977.

Chopra, A.K. "Dynamics of Structures- Theory and Application to earthquake engineering", Prentice Hall, NJ,1995.

Japanese Society of civil Engineers. "Dynamic Analysis and earthquake resistance Design " Volume -1, 2, 3; Oxford and IBH Publishing co.Pvt. Ltd New Delhi.

Biggs, J.M.," Introduction to Structural Dynamics", McGraw Hill Publishing Co., N.Y. 1964.

Fertis, D.G.," Dynamics and Vibrations of Structures", John-Wiley and sons, London,1973.

Freberg, C.R., and Kemler, E.N.," Element of Mechanical Vibrations", John-Wiley and sons Inc., NY, 1960.

Grover, G.k.," Mechanical Vibrations", Nem Chand and Bros., Roorkee, 1977.

Housener, G.W. and Hudson, D.E.," Applied Mechanics_ Dynamics", East-West Edition, New Delhi, 1961.

Pankaj Agarwal & Manish Shrikhande. "Earthquake Resistant Design of Structures", Prentice Hall, ND, 2007.

Assessment process

Continuous assessment - 30 marks (30%)

1.   Assignment – 10 marks.

2.   Mid term Test- 10 marks.

3.   Class test/ surprise test/ quizzes- 10 marks.

2. Semester End Examination - 70 marks (70%)

Pre-requisites: Design of Concrete Structures

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Appendix 6.1.2: Introduction to Robotics

Module Code: E810

Semester: VIII

Credit Value: 12

Module Tutor: Y

General objectives or aims of the module:

Fundamentals of robotics, rigid motions, homogeneous transformations, forward and inverse kinematics, velocity kinematics, motion planning, trajectory generation, and control.

Learning outcomes:

At the end of the module, students are expected to be able to:

Be familiar with Denavit-Hartenberg convention.

Be familiar with Lagrange-Euler formulation.

Be able to control a robotic manipulator effectively by computer simulation.

Be familiar with the computer simulation skills associated with robotic control.

Be able to use FFT to analyze the link vibration from the robotic links.

Learning and teaching approaches:

Lectures: 3 hours per week

Tutoring: 1 hour per week

Self study: 4 hours per week

Assessment:

Item	Point	Quiz Date/Time	Place	Quiz Result Returning Date
Quiz I	10	Feb. 26th, 2010 Friday 20:00~21:30.	Theatre	Mar. 5 2010 Friday
Quiz II (Midterm)	10	Mar. 26th, 2010 Friday 20:00~21:30.	Theatre	Apr. 30 2010 Friday
Quiz III	10	Apr. 30th, 2010 Friday 20:00~21:30	Theatre	May 2010 Friday
Semester exam	70	To be determined. (TBD)	TBD	TBD

Subject matter:

Introduction: Historical development of robots; basic terminology and structure; robots in automated manufacturing

Rigid Motions and Homogeneous Transformation: Rotations and their composition; Euler angles; roll-pitch-yaw; homogeneous transformations; Matlab and Mathematica code for symbolic and numerical computation

Forward Kinematics: Common robot configurations; Denavit-Hartenberg convention; A-matrices; T-matrices; examples

Inverse kinematics: Planar mechanisms; geometric approaches; spherical wrist

Velocity kinematics: Angular velocity and acceleration; The Jacobian; singular configurations; singular values; pseudoinverse; manipulability

Motion planning: Configuration space; artificial potential fields; randomized methods; collision detection

Trajectory generation: Joint space interpolation; polynomial splines; trapezoidal velocity profiles; minimum time trajectories

Feedback control: Actuators and sensors; transfer functions; tracking and disturbance rejection; PID control; feed forward control; resolved motion rate control.

Linear control of manipulators: second-order linear systems, damping ratio, natural frequency, control-law partitioning (model-based portion, servo portion), trajectory-following control, disturbance rejection, modeling and control of a single joint.

Nonlinear control of manipulators: nonlinear and time-varying systems, multi-input, multi-output control systems, Lyapunov stability analysis.

Reading list

Murray, Richard M., Li, Zexiang, Sastry, S. Shankar, "A Mathematical Introduction to Robotic Manipulation", CRC Press, New York.

Fu, K. S., Gonzalez, R. C., Lee, C. S. G., "Robotics – Control, Sensing, Vision, and Intelligence", McGraw-Hill International Edition, 1975.

Craig, John J., "Introduction to Robotics Mechanics and Control," 3rd Edition, Pearson Prentice Hall, ISBN 0-13-123629-6.

Date: Feb. 6th, 2010

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Appendix 6.1.3: High Voltage Engineering

Module Code: HVE401

Semester: VIII

Credit Value: 9

Module Tutor: Z

General objectives or aims of the module:

This module will familiarize students with the topics in high voltage which are essential. The module will develop the students' abilities to solve numericals in high voltage using the knowledge, understanding and they have gained in the class.

Learning outcomes:

At the end of this module, students are expected to be able to:

Identify the different applications of high voltage

Analyse basic problems in dealing with high voltage

Explain theories of breakdown in gaseous, liquid, solid and vacuum medias

Distinguish and explain different types of insulations

Explain the insulation design of different types of machines

Identify and explain the different types of tests on equipment

Solve numerical problems regarding high voltage topics

Learning and teaching approach used

Lectures: 2 hours per week.

Tutorial: 1 hour per week.

Self study: 6 hours per week.

Assessment

Continuous assessment: 30 marks

1. Assignment: 10 marks

2. Class Tests (closed book):   5 marks

3. Mid –Term test: 10 marks

4. Case study: 5 marks

Semester End Examination: 70 marks

Written examination: 3 hours, 70 marks, closed book.

Students must obtain 40% each in the Continuous assessment of theory and the semester end examination. The overall pass mark for the module is 50%.

Subject matter of the module:

Introduction: Areas in which high voltages are used, Basic problem in dealing with high voltages.

Conduction and Breakdown: Basic processes of conduction, current growth, Theories of breakdown in gaseous, liquid, solid and vacuum insulation.

Insulation Design Principles: Types of insulating materials - temperature classification, Factors affecting dielectric strength, Insulation design of rotating machines, transformers, transmission lines, switchgear etc.

High Voltage measurement and Test Equipment: High Voltage Measurement, Sphere gap and charging current method, H.V. Bridges for permittivity & loss angle measurement, Test equipment for AC, DC impulse, partial discharge, dielectric tests etc.

High Voltage Testing of Electric Apparatus: Significance of various tests, Examples of testing of insulators, bushings, transformer, cables, lightning arresters, etc.

Reading list

Naidu and Kamaraju (2009), High Voltage Engineering, Tata McGraw Hill Publishing Company, New Delhi.

Wadha, C L (2007), High Voltage Engineering, New Age International, New Delhi.

Date: 14th January 2006

Appendix 6.2: Lesson Observations

Appendix 6.2.1 – Seismic Engineering

Lesson Observation Record

College: College of Science and Technology Phuentsholing	Lecturer: X
Observer: Deki C. Gyamtso	Date: 12.04.10
Time: 10 – 11 am	Subject: Earthquake Engineering
Topic: Seismic Engineering	No. of Students: 30

Proposed learning outcomes:

    Understand how to analyse seismic force

    Interpret the result of seismic force

    Analyse using both software and manual calculations of seismic force on building structures

Time	Teacher Activity	Student Activity	Comments
10.05	Settles class for the lesson	Listen	Lecturer has good content knowledge
10.07	Introduces topic, write on the board and briefs the class on its proceedings.	Listen	Teacher is spoke softly, is serious and is involved in her teaching.
	Explains and recaps the concept of seismic analysis (writes a mathematical problem on board while explaining)	Open their Code books	Uses the code book extensively to refer to formulae and calculations. Is knowledgeable and confident with the content.
	Instructs students to open their Code books and explains the code and formula.	Look at the Code, formula and listen to the teacher's explanation.	Manuals S-13920 (Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces – Code of Practice) and IS-1893 (Criteria for Earthquake Resistant Design of Structures)
	Reads aloud the Code and the writes formula on the board. Explains details of the code, the formula and the steps.	Copy board work in their note books. Students are engaged in listening, copying the calculations from the board	Uses the whiteboard extensively to explain the calculations in detail.
	Demonstrates the calculations of seismic analysis on the board with detailed explanation	Watch, listen and copy the calculations from the board.	Teacher mostly interacts with the first row of students asking questions and confirmation of the formulae during the explanation but later when a task is assigned to the class, she goes around checking,
	Situation: Building in Zone V with medium soil		

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Time	Teacher Activity	Student Activity	Comments
	related to the floor load and roof load of the building structures.		explaining, and answering questions.
10.55	Class directed to refer to the code book for the formulae.	Some students engage themselves in discussing, solving the problem by themselves, while other simply wait for the teacher to write it on the board.	The class could do with some clear directions so that it will give them some responsibility for their learning and not simply copy from the teacher.
	Writes a problem to calculate the seismic analysis of force acting upon different floors of a building.		Could have asked the students to calculate individually thereby involving them in the lesson and not as passive learners.
	Gets the class involved in the calculations by working out the solution together, explaining each step, recapping previously learnt concepts.	Watch the LCD presentation of the software	The lesson is focussed on the calculation of seismic analysis manually and using the software CAD.
	Goes around checking the students' work, explaining when asked by some and encouraging them to complete the calculations.	Listen to the explanation and make some contributions to the steps.	A student quietly sleeps through the demo and explanation.
	Switches on the LCD and demonstrates the use of the software CAD to calculate the seismic analysis.	Listen and nod in agreement.	The use of the white board and the PowerPoint in the lesson is good as it allows flexibility. PowerPoint by itself is rather linear.
	Explains as each step unfolds and inquires if the class has understood the process.		
	Recaps the key concepts of the lesson and the codes used for the calculations.		
	Briefs class on the next lesson and close the lesson.		

Appendix 6.2.2 Linear Control Robotics

Lesson Observation Record

College: College of Science and Technology Phuentsholing	Lecturer: Y
Observer: Deki C. Gyamtso	Date: 13.04.10
Time: 8 – 9 am	Subject: Introduction to Robotics
Topic: Linear Control Robotics	No. of Students: 13

Proposed learning outcomes:

Understand clearly the concept of Linear Control Robotics

Apply the concepts learnt from the demonstrations with confidence

Acquire knowledge for the Quiz No. 3 (to be held later in the week)

Time	Teacher Activity	Student Activity	Comments
8.00	Greets class and briefs on management issues regarding attendance and impending activities.	Listen	While solving the problem, the teacher explains the simple and complex ways of doing it and advises the students how to approach the problems in a simple and straightforward way.
	Writes a problem using formulae 9 – 1 and 9 – 2 related to linear control robotics on the board.	Listen attentively, answer questions, and copy from the board.	
	Solves asking questions and explaining using method #1.		
	Writes method #2 and asks students to solve it themselves.	Try to solve the problem individually.	In the beginning there are only 3 students in the class, but the teacher begins his class on the dot of 8 o'clock. After 10 minutes a few more join class and this continues for 15 minutes till 13 of them are sitting in the class by 8.15 am.
8.20	After a few minutes, explains the difference between methods and solves the problem explaining each step.	Listen and compare their work with the board.	
8.23	Calls class to attention to brief on class management issues related to attendance and the quiz to be held next week on what has been covered so far.	Listen and make note of it.	Is patient and approachable and uses humour in his teaching like saying "Who am I?" when finding the answer – filling in the blank spaces.
	Write 9 -3 on the board and proceeds to solve the problem explaining each step. Recaps 9– 1 and 9-2 and makes links to the present problem.	Copy the problem and listen carefully.	However the students are rather quiet - listening, solving and

Time	Teacher Activity	Student Activity	Comments
8.40 9.00	Inquires if the class has understood and makes an analogy to everyday travel to explain the concept of the problem. Writes the next problem 9 – 4 and the following questions: "Why would I want to learn how to control the system anyway? Suppose nature of our robot is not what we need, perhaps it is underdamped/underclamped or oscillating all the time and we would like to be critically damped?" Accepts the students' answers and proceeds to explain the above question in detail writing on the board, illustrating the concept using diagrams. Asks questions to the students. Concludes the lesson by briefly recapping the key ideas and reminding the class about the quiz.	Listen Write the questions in their notebooks and make attempts to answer. Listen and write in their books. Make attempts to answer.	copying from the board. There is not much interaction from the students. They nod in agreement, listen attentively and show interest through these non-verbal cues. Towards the 2nd half of the lesson (8.30), the students gradually warm up making contributions to the lesson by answering questions. Non-verbal clues are evident like nodding, listening attentively, writing down everything the teacher says and leaning forward.

Appendix 6.2.3 High Voltage Generation

Lesson Observation Record

College: College of Science and Technology Phuentsholing	Lecturer: Z
Observer: Deki C. Gyamtso	Date: 13.04.10
Time: 11 – 12 am	Subject: High Voltage Engineering
Topic: High Voltage Generation	No. of Students: 26

Proposed learning outcomes:

    Understand the concept of high voltage generators for different voltage values

    Become familiar with the models of high voltage generators.

Time	Teacher Activity	Student Activity	Comments
11.00 am	Greets class and takes attendance of the students Switches on the LCD and prepares for the lesson.	Greet and respond to their names	Teacher is warm, polite and approachable with the students and smiles alot.
11.10	Begins PowerPoint presentation with display of the complete set of Module objectives, learning outcomes, asks students to identify the ones covered so far, and highlights the learning outcome of today's lesson.	Watch and listen	Students are quiet and attentive. Non-verbal clues are evident like nodding, listening attentively and leaning forward.
	Proceeds to the 2nd slide on AC/DC Impulser – High Voltage Sources. Reads it aloud to the class and explains.	Look at the slide and listen	
	Asks questions on what has been explained.	Respond to the questions.	Mostly students call out the answers but they are rather hesitant.
	Moves onto the 2nd Slide Reads it aloud and proceeds to explain the content on Generation of High AC Voltage with diagrams and pictures.	Look at the slide and listen	Sometimes the students do not respond to the questions and the lecturer answers them himself.
	Asks questions.	Respond to the questions.	
	The same procedure follows for the next 8 slides.	Look at the slides, listen and respond to question when they can.	
	Explains the content of the slide and asks questions to recap previous concepts.		The lecture is interspersed with questions eliciting responses from the students.
	Uses the whiteboard to write formulae and explains the	Respond to the questions.	

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Time	Teacher Activity	Student Activity	Comments
11.56	problems of high voltage generators. Asks questions related to different situations. Questions about numerical problems related to high voltage generators for different voltage situations such as for *simple voltage doubler, cascade voltage doubler, and multiple circuits.* Inquires if the class has understood and tells them to ask questions. Recaps lesson by reviewing what has been covered and informs about the next lesson.	They all nod that they have understood	Towards the latter half of the lesson, the students warm up to the lesson. Lecturer makes an attempt to make light of the situation by saying that either all of them have understood everything very well or nothing at all, when they ask no questions.

Appendix 6.3: In-Lesson Questionnaires

Appendix 6.3.1 Seismic Engineering

Lecturer: X

Subject: Earthquake Engineering

College: CST, 4C

26 students

In Lesson Questionnaire for Students

This questionnaire is anonymous. Your identity will be protected as according to the research mandate and only I and my supervisors at the University of New England will see these responses. Your careful response would be appreciated. There are no right or wrong answers to these questions. Simply put down what *you* think. Please do not discuss with your friends.

These first questions refer to the strengths and weaknesses of the lesson that you have just experienced. Please rate these using the scale below by putting a cross (x) in the box which best corresponds to your answer:

4 – Excellent

3 – Good

2 – Acceptable

1 - Unsatisfactory

NA – Not Applicable/seen

	Rating				
Planning and organising teaching	4	3	2	1	NA
The lesson learning outcomes were clear	57.7%	42.3%			
Lesson contents were systematically organised	50%	42.3%	7.7%		
The choice of learning materials were appropriate	46.2%	42.3%	7.7%		
The learning activity aroused students' interest	53.8%	46.2%			
There was an appropriate use of teaching materials	51.9%	44.4%	3.7%		
Communication Skills					
The lesson appropriately encouraged me	19.2%	69.2%	11.5%		
There were clear explanations, instructions and demonstrations	42.3%	42.3%	15.4%		
Class interaction					

Encouraged me to participate in activities	19.2%	46.2%	26.9%		3.7%
Provided opportunities for students to participate in class discussions	7.4%	37%	48.1%	3.7%	3.7%
Provide opportunities for me to work in collaboration (groups)	11.5%	19.2%	53.8%	7.7%	7.7%
Maintained a congenial and open atmosphere	11.5%	65.4%	15.4%	3.8%	3.8%
Professional Knowledge					
Good mastery of the contents shown	34.6%	57.7%	3.8%		
Professional attitude					
Showed a genuine attitude towards teaching	38.5%	57.7%	3.8%	3.8%	
Respected my viewpoints/opinions	15.4%	53.8%	19.2%	3.8%	
Has appropriate expectations of my learning	19.2%	65.4%	11.5%		3.8%

To what extent was this lesson typical when compared to previous lessons with this lecturer? U*se the "yes" table* and tick in the boxes given in the table for those aspects that were similar and explain in what ways the lesson was similar in "Explanation". For those aspects that were not similar, use the "*No" table and* put a cross in the boxes given in the second table for those aspects that were not similar and explain in what ways today's lesson was different in "Explanation"

Yes	Planning and organising teaching	Communication Skills	Class interaction	Classroom management	Professional Knowledge	Professional attitude
6-23.1%	22-84.6%	15-57.7%	14-53.8%	15-57.7%	20 -76.9%	16-61.5%

Explanation:
1. Using board. Showing the practical way in using of stand pro for its teaching purpose.
2. All of the above marked aspects have been same ever since she first taught us all.
3. The above things were found out to be similar to the previous class.
4. Class was same compared to previous lesson in all aspects.
5. The topic which was taught is in continuation with what we have been learning for the past few classes. The only difference is the method used in numerical analyses.
6. All was similar.
7. This particular lesson was well organized and very well prepared.
8. It was well organized and well planned lecture.
9. Firstly usage of the code was explained then numerical problem was solved and the amylase was done is standard procedure.
10. Pre-planned and well organize all the time.
11. Everything was similar.

NO 1-3.8%	Planning and organising teaching 2-7.7%	Communication Skills 5-19.2%	Class interaction 4-15.4%	Classroom management 1-3.8%	Professional Knowledge	Professional attitude 3-11.5%

Explanation:
1. Usually, the lecture is not audible and those of us sitting at the back cannot hear her.
2. In previous classes the tutor doesn't come prepared.
3. The lesson was made more lively today, well organize, audible and more understandable.
4. Voice is not clear enough.

3. Overall what is your rating of this particular lesson? (Please circle just one response.)

    4 – Excellent////////=8-30.8%

    3 – Good////////////////=16-61.5%

    2 – Acceptable//=2-7.7%

    1 - Unsatisfactory

4. Any other Comments? (Please confine your comments to the lesson)

The only feedback that I have been giving for this module tutor is her voice level which at times is not audible. And the noise from the classroom fan worsen the situation.

Should be more audible.

Despite her low voice the coverage of the syllabus, time of completion of syllabus, speed of coverage, relevancy of the topic appropriate.

Thank you for participating. Please hand this directly to me at the end of the lesson

Appendix 6.3.2 Linear Control Robotics

Lecturer: Y

Subject Introduction to Robotics

 Class BE 4 E

13 students

"In lesson" Questionnaire for Students

This questionnaire is anonymous. Your identity will be protected as according to the research mandate and only I and my supervisors at the University of New England will see these responses. Your careful response would be appreciated. There are no right or wrong answers to these questions. Simply put down what *you* think. Please do not discuss with your friends.

These first questions refer to the strengths and weaknesses of the lesson that you have just experienced. Please rate these using the scale below by putting a cross (x) in the box which best corresponds to your answer:

4 – Excellent

3 – Good

2 – Acceptable

1 - Unsatisfactory

NA – Not Applicable/seen

	Rating				
Planning and organising teaching	4	3	2	1	NA
The lesson learning outcomes were clear	38.5%	61.5%			
Lesson contents were systematically organised	61.5%	38.5%			
The choice of learning materials were appropriate	23.1%	69.2%	7.7%		
The learning activity aroused students' interest	30.8%	46.2%	23.1%		
There was an appropriate use of teaching materials	23.1%	53.8%	23.1%		
Communication Skills					
The lesson appropriately encouraged me	30.8%	46.2%	15.4%		
There were clear explanations, instructions and demonstrations	46.2%	23.1%	30.8%		
Class interaction					

Encouraged me to participate in activities	46.2%	38.5%	15.4%		
Provided opportunities for students to participate in class discussions	46.2%	38.5%	7.7%	7.7%	
Provide opportunities for me to work in collaboration (groups)	23.1%	46.2%	23.1%	7.7%	
Maintained a congenial and open atmosphere	53.8%	23.1%	15.4%	7.7%	
Professional Knowledge					
Good mastery of the contents shown	30.8%	61.5%		7.7%	
Professional attitude					
Showed a genuine attitude towards teaching	61.5%	38.5%			
Respected my viewpoints/opinions	38.5%	53.8%	7.7%		
Has appropriate expectations of my learning	30.8%	53.8%	15.4%		

Yes	Planning and organising teaching	Communication Skills	Class interaction	Classroom management	Professional Knowledge	Professional attitude
	11-84.6%	9-69.2%	7-53.8%	9-69.2%	10-76.9%	11-84.6%

Explanation:

1. He had framed just enough materials to be taught within an hour, he has well planned course to conduct the class.

2. good in planning the lesson for teaching and following it accordingly, have great professional knowledge.

3. he is very sincere and hardworking, also he have good professional attitude and knowledge.

4. our teacher he use to prepare and make plan what is about next class, his pronunciation is clear and English language is good.

5. the way of teaching and management of class room are same every time.

6. the way of communication and lesson organized is the same.

7. as always he plans and organizes his teaching very appropriately with right attitude using his marvellous knowledge.

8. method of teaching is similar.

9. he came on exact time as always and left the class at exact time.

10. Method of teaching is similar although the content of subject is

NO	Planning and organising teaching	Communication Skills//=2-15.4%	Class interaction 3-23.1%	Classroom management 1-7.7%	Professional Knowledge	Professional attitude

completely different.

11. he is always cool and calm.12. everything is relevant in subject matters and teaching methods.

Explanation:

1. *Often I have difficulty in catching up his English and in American accent.*

2. *Speaks well but lacks convicting nature and explanations.*

3. *No group discussion.*

4. *In previous lesson there was more of class interaction and management, this is lacking in today's session.*

To what extent was this lesson typical when compared to previous lessons with this lecturer? U*se the "yes" table* and tick in the boxes given in the table for those aspects that were similar and explain in what ways the lesson was similar in "Explanation". For those aspects that were not similar, use the *"No" table and* put a cross in the boxes given in the second table for those aspects that were not similar and explain in what ways today's lesson was different in "Explanation"

Overall what is your rating of this particular lesson? (Please circle just one response.)

4 – Excellent- 1-7.7%

3 – Good - 8-61.5%

2 – Acceptable - 3-23.1%

1 – Unsatisfactory -1-7.7%

Any other Comments? (Please confine your comments to the lesson)

This module is very new to the Bhutanese education system.

As a professional, be kind to all and respect everybody view point.

Avoid partiality.

This lesson would be much helpful if there is more resources for learning. Due to lack of resource we are failing in our part to

understanding but he manages by making notes.

This lesson is full of mathematics and interesting.

This subject relates mathematics with the real world. It's actually an interesting subject where you need to know the basic of mathematics and how to apply it.

You need to use your brain to tackle the solutions.

Teachers should have a good communication and most of all should to good in delivering his ideas.

Introduction to robotics is a relevant module but there should have adequate references, we lack good reference books in our library.

Thank you for participating. Please hand this directly to me at the end of the lesson

Appendix 6.3.3 High Voltage Generation

Lecturer: Z

Subject: High Voltage Engineering

Class 4th Year, CST

 26 students

"In lesson" Questionnaire for Students

This questionnaire is anonymous. Your identity will be protected as according to the research mandate and only I and my supervisors at the University of New England will see these responses. Your careful response would be appreciated. There are no right or wrong answers to these questions. Simply put down what *you* think. Please do not discuss with your friends.

These first questions refer to the strengths and weaknesses of the lesson that you have just experienced. Please rate these using the scale below by putting a cross (x) in the box which best corresponds to your answer:

4 – Excellent

3 – Good

2 – Acceptable

1 - Unsatisfactory

NA – Not Applicable/seen

	Rating				
Planning and organising teaching	4	3	2	1	NA
The lesson learning outcomes were clear	61.5%	34.6%			
Lesson contents were systematically organised	57.6%	38.4%	3.8%		
The choice of learning materials were appropriate	50%	46.1%	3.8%		
The learning activity aroused students' interest	42.3%	61.5%		3.8%	
There was an appropriate use of teaching materials	38.4%	53.8%	7.6%		
Communication Skills					
The lesson appropriately encouraged me	50%	38.4%	11.5%		
There were clear explanations, instructions and demonstrations	57.6%	42.3%			
Class interaction					
Encouraged me to participate in activities	30.7%	61.5%	7.6%		
Provided opportunities for students to participate in class discussions	50%	42.3%	7.6%		
Provide opportunities for me to work in collaboration (groups)	19.2%	65.3%	11.5%	3.8%	
Maintained a congenial and open atmosphere	42.3%	46.1%	7.6%		
Professional Knowledge					

Good mastery of the contents shown	65.3%	26.9%	3.8%		
Professional attitude					
Showed a genuine attitude towards teaching	65.3%	34.6%		3.8%	
Respected my viewpoints/opinions	57.6%	42.3%			
Has appropriate expectations of my learning	46.1%	50%	3.8%		

To what extent was this lesson typical when compared to previous lessons with this lecturer? U*se the "yes" table* and tick in the boxes given in the table for those aspects that were similar and explain in what ways the lesson was similar in "Explanation". For those aspects that were not similar, use the "*No" table and* put a cross in the boxes given in the second table for those aspects that were not similar and explain in what ways today's lesson was different in "Explanation"

Yes	Planning and organising teaching	Communication Skills	Class interaction	Classroom management	Professional Knowledge	Professional attitude
	19-73%	22-84.6%	18-69.2%	22-84.6%	23-88.4%	23-88.4%

Explanation:
1. In all most every semester in my entire course and as the modules he took entirely from his field, he had left no stone unturned to improve knowledge to us, have been taking lecture.
2. No change in the communication skills, class interaction.
3. The lesson taught are related to previous class as its the continuation from the previous class and teaching skills and management were same.
4. He always teaches well, so good. He always comes prepared what is going to teach & give nice demonstration also.
5. Method of teaching and way of explaining the contents of the subject are same and the content of subject is related to what we have studied before
6. He has a professional knowledge and he always plan & organise.
7. As usual lecturer Z plans and organise his teaching appropriately with good communications skill having right attitude towards teaching & also towards students.
8. Good at the professional knowledge & attitude.
9. No change.
10. I took five courses from this lecturer and all are related to his field, so the way of delivering is same.
11. Previously there was the defecting the notes in the class and the explanation was less but with slide presentation. There was more explanation.
12. Conducted a well organised lecture all the time and the lesson are related and found to be mandatory.
13. Lecturer is very knowledgeable person in the field of power system.
14. The way the lesson was planned and organised was similar, the lecturer has the professional knowledge and attribute.
15. He does explain as the same as he did and ask questions.
16.lecturers use same skills and interactions, as the previous lesson, knowledge and attitude are same.
17. He is always good in everything.
18. Lesson is taught in similar to the previous session.
19.the students clear the doubts. Teacher has good communication in English where we can understand, let the student clear their doubt.
20.I found his attitude as same as before but he use overhead projector for the first time, but he mentioned about it long time back.
21. Teaches what is in the plan/schedule, he has enough knowledge in his subject specially in theories.

NO	Planning and organising teaching 3-11.5%	Communication Skills 2-7.6%	Class interaction 2-7.6%	Classroom management 2-7.6%	Professional Knowledge	Professional attitude

Explanation:
1. *Before this lecture, he didn't use projector, he use to write on the board and dictated.*
2. *Before this lecture, didn't use projector instead taught us by notes.*
3. *He rarely uses PowerPoint presentation to teach.*
4. *The only problem is the way of pronunciation is quiet different, i had a difficulty in catching up what he speaks.*
5. *He really use PowerPoint rather he dictate.*
6. *Today lecturer used LCD for explanation. Usually lecturer used to use the white board.*
7. *No group discussion and pronunciation is not that clear*

3. Overall what is your rating of this particular lesson? (Please circle just one response.)

4 – Excellent - 11-42.3%

3 – Good -13-50%

2 – Acceptable -1-3.8%

1 - Unsatisfactory

4. Any other Comments? (Please confine your comments to the lesson)

He has good knowledge of the subject matter.

Though this subject is purely theoretical and some time creates a monotony but the respective tutors tries to explain at his best s he has great knowledge about the particular subject he is teaching.

Feedback is late.

This course is theoretical and the lecturer is taking theoretical course for us for the first time.

Good teacher should have good knowledge.

Thank you for participating. Please hand this directly to me at the end of the lesson.