

Power System Electromagnetic Compatibility

2 units (selection)

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Target 1. To give the students understanding of the characteristics of electromagnetic compatibility in nature. 2. To give the students understanding of the characteristics of electromagnetic field generated from power system and the effect on biological system 3. To give the students understanding of the mechanisms of electromagnetic field generated from power system, the mitigation and the detection method. . 4. To improve the presentation skill of students by presenting the latest transaction or journal papers in this filed in English.

Outline Characteristics of artificial electromagnetic fields of DC, extremely low frequency (ELF) and high frequency (HF) arising from power systems are quantitatively explained as well as those of the fields from natural environments. Associate Prof. Shimomura gives lectures on how the electromagnetic fields are produced by power systems and on the management (characterization, reduction & mitigation and public education) of ELF electric and magnetic fields. Associate Prof. Kawada gives lectures on how the high frequency electromagnetic fields are produced by power systems and on the detection of VHF and UHF electromagnetic waves.

Style Lecture in combination with Portfolio

Keyword *electrical power engineering, electromagnetic compatibility, bioelectromagnetics*

Relational Lecture “**Advanced Theory of Electric Power Control Systems**” (0.5)

Requirement Understanding of electromagnetic compatibility

Goal

1. To understand the characteristics of electromagnetic compatibility in nature.
2. To understand the characteristics of electromagnetic field generated from power system and the effect on biological system
3. To understand the mechanisms of electromagnetic field generated from power system, the mitigation and the detection method. .

Schedule

1. EMC in nature 1 (Electric field)
2. EMC in nature 2 (Magnetic field)
3. Characteristics of power system EMC 1 (Electric field)

4. Characteristics of power system EMC 2 (Magnetic field)

5. Characteristics of low frequency electromagnetic field generated from power system 1

6. Characteristics of low frequency electromagnetic field generated from power system 2

7. Effect of low frequency electromagnetic field generated from power system on biological system 1

8. Effect of low frequency electromagnetic field generated from power system on biological system 2

9. Mechanisms of electromagnetic field generated from power system.

10. Coupling mechanisms of electromagnetic field and biological system

11. Analysis method between electromagnetic field and biological system

12. Social effects on electromagnetic field generated from power system

13. Mechanisms of the high frequency electromagnetic field generated from power system 1

14. Mechanisms of the high frequency electromagnetic field generated from power system 2

15. Method to detect the high frequency electromagnetic field generated from power system

16. Conclusion of power system EMC

Evaluation Criteria Assignment 50%, Presentation 50%. Totally 60% is required.

Textbook printed material

Reference

- ◇ D.F.Warne, Electrical Power Engineer’s Handbook, Newnes
- ◇ J.Patrick Reilly, Applied Bioelectricity, Springer
- ◇ IEEE Trans on ”Energy Conversion”, ”Power Delivery”, ”Electromagnetic Compatibility”, and ”Dielectrics and Electrical Insulation”

Contents <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216792>

Student Able to be taken by only specified class(es)

Contact

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Note)

- ◇ Language: Engli
- ◇ Self-study:Preparation 2 hours and review 2 hours for every class (2hours) .