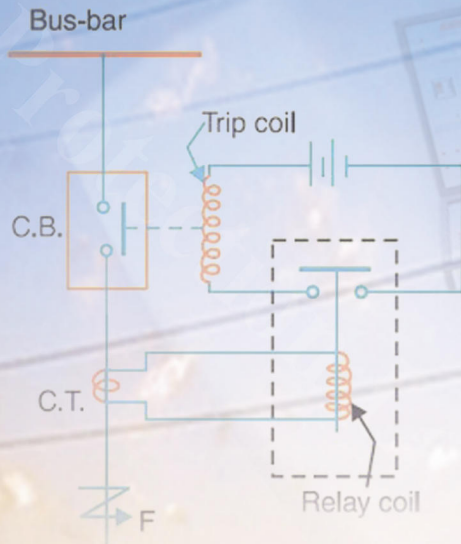


Mansoura University
Engineering Faculty
Electrical Engineering Department



Protection Laboratory



جامعة المنصورة

كلية الهندسة

برنامج هندسة القوى والآلات الكهربائية

دليل معمل

الحماية الكهربائية

2021 / 2020



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بيانات المعمل الاساسية



اسم المعمل	معمل الحماية الكهربائية
القسم العلمي	قسم الهندسة الكهربائية
المشرف	أ.د/ إبراهيم عبدالغفار بدران
مهندس المعمل	م/ أحمد نادر شتا
أمين المعمل	م/ رويدا ابراهيم محمد
الموقع بالنسبة للكلية	مبنى المعامل البحرية – الدور الثاني
مساحة المعمل	120 م ²
تاريخ انشاء المعمل	أنشئ عام 1990م وتم تحديث البيئة التحتية له في عام 2019 م



رسالة معمل الحماية الكهربائية



Mission	الرسالة
The mission of the electrical protection laboratory is to prepare distinguished graduates who are able to compete locally and regionally in the scientific and research fields of protecting electrical networks, preserving their equipment, and participating in community services within a framework of ethical commitment.	تتمثل رسالة معمل الحماية الكهربائية في إعداد خريجين متميزين وقادرين على المنافسة محليا وإقليميا في المجالات العلمية والبحثية الخاصة بحماية الشبكات الكهربائية والحفاظ على معداتها والمشاركة في الخدمات المجتمعية في إطار من الإلتزام الأخلاقي.





الأجهزة والمعدات بالمعمل



م	اسم الجهاز	الشركة الصانعة	الكمية
1	Generation Unit/Power Supply Module	BEDO	1
2	Generation Protection Module	BEDO	1
3	Step Up / Synchronization Substation Module	BEDO	1
4	Step Up Protection Module	BEDO	1
5	Step Down Substation Module	BEDO	1
6	Step - Down Substation Protection Module	BEDO	1
7	Loads Module	BEDO	1
8	Load Protection Module	BEDO	1
9	Dynamometer Module	BEDO	1
10	Axillary Module	BEDO	1
11	Transmission Line Module	BEDO	1
12	Power Grid Module	BEDO	1
13	Meters Module	BEDO	1
14	Synchronous Generator	BEDO	1
15	Three phase induction motor	BEDO	1
16	DC Motor	BEDO	1
17	Tacho Generator	BEDO	1



الخدمات الطلابية التي يؤديها المعمل



750 طالب	عدد الطلاب المستفيدين من المعمل
قسم الهندسة الكهربائية الفرقة الأولى – الثالثة - الرابعة	الأقسام العلمية المستفيدة من المعمل الفرق الدراسية المستفيدة من المعمل
مادة الحماية الكهربائية – مادة اختبارات كهربية 3	المقررات الدراسية التي تستفيد من المعمل
تجارب عملية – مشاريع طلابية – أبحاث علمية	الأنشطة الطلابية داخل المعمل
29	عدد الرسائل العلمية التي تمت في المعمل
21	عدد المشاريع الطلابية التي تمت في المعمل



الرسائل العلمية التي تمت في المعمل



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No.	Student name	Thesis type and title
Awarded Thesis		
1	M. El-morsy	M.Sc. Thesis "Study of the Interaction between the Static Var Compensators and the Excitation Systems", Faculty of Engineering, Mansoura University, Awarded at 27 March 2008.
2	E. Ali	M.Sc. Thesis, "Intelligent Model for Diagnosis of High Impedance Faults in Electrical Power Systems", Faculty of Engineering, Mansoura University, Awarded at 30 June 2011.
3	H. Albaramawy	M.Sc. Thesis "Evaluation of DG Impact on the Behavior of North Delta Distribution Network Protection System", Faculty of Engineering, Mansoura University, Awarded at 20 September 2012.
4	E. Mohamed	M.Sc. Thesis "Determination of Typical Criteria for the Evaluation of Resonance Stresses in HV Transformers", Faculty of Engineering, Mansoura University, Awarded at 24 June 2013.
5	M. Ibrahim	M.Sc. Thesis "Computation of Very Fast Transients in Gas Insulated Substations", Faculty of Engineering, Mansoura University, Awarded at 30 August 2013.
6	E. Tantawi	M.Sc. Thesis "Study of Current Interruption Transients Phenomena", Faculty of Engineering, Mansoura University, Awarded at 30 August 2013.
7	M. Abel-Aziz	M.Sc. Thesis "Discrimination the Transformer Internal Winding Faults", Faculty of Engineering, Mansoura University, Awarded at 20 January 2014.
8	E. Megahed	M.Sc. Thesis "Mitigation of Temporary Overvoltages in Weak Grids Connected to HVAC Systems", Faculty of Engineering, Mansoura University, Awarded at May 2014.
9	H. Shaillan	M.Sc. Thesis "Fault Ride-Through Capability Enhancement of PV Systems", Faculty of Engineering, Mansoura University, Awarded at November 2015.
10	M. Al-adawy	M.Sc. Thesis "Design and Operation of Active Power Conditioners", Faculty of Engineering, Mansoura University, Awarded at October 2016.
11	O. Elfedawy	M.Sc. Thesis "Improvement of Voltage Regulation in NDEDC", Faculty of Engineering, Mansoura University, Awarded at February 2018.
12	W. Alhadad	M.Sc. Thesis "Fuzzy Logic-Based Distance Protection Model for Series Compensated Lines in ATP", Faculty of Engineering, Mansoura University, Awarded at April 2018.
13	E. Megahed	Ph.D. Thesis "Investigation of Transient Overvoltages in MicroGrids", Faculty of Engineering, Mansoura University, Awarded at Feb. 2019.
14	B. Elaghory	M.Sc. Thesis "Investigation of Distribution Generation Impact on Electrical Distribution Systems", Faculty of Engineering, Mansoura University, Awarded at June 2019.
15	R. Ibrahim	Ph.D. Thesis "Smart Enhancement of the Transmission Grids Performance", Faculty of Engineering, Mansoura University, Awarded at August 2019.
16	E. Mohamed	Ph.D. Thesis "Improvement of Electric Voltage Quality using Electronic On-Load Tap-Changer of Distribution Transformers with application on NDEDC", Faculty of Engineering, Mansoura University, Awarded at Feb 2020.
17	M. Elbekasy	M.Sc. Thesis "Transient Analysis of Electric Railways Systems", Faculty of Engineering, Mansoura University, Awarded at May 2020.
18	I. Ibrahim	M.Sc. Thesis "Study of Transient Overvoltages in Grid-Connected PV Systems", Faculty of Engineering, Mansoura University, Awarded at July 2020.



Current thesis

19	H. Albaramawy	Ph.D. Thesis "Study of Fault Ride Through of Distributed Generation Units Connected to Distribution Systems", Faculty of Engineering, Mansoura University, since 23 August 2015. (Recorded 20 Jan. 2014).
20	M. Barakat	M.Sc. Thesis "Transformer Protection Against Transients of Electric Power Systems", Faculty of Engineering, Mansoura University, since 18 March 2015.
21	E. Tantawi	Ph.D. Thesis "Transient Analysis of Electric Power Systems", Faculty of Engineering, Mansoura University, since 24 July 2016.
22	A. Hasan	M.Sc. Thesis "Modeling of Dynamic Tests for Protection Devices", Faculty of Engineering, Mansoura University, since 23 October 2017.
23	N. Mohamed	M.Sc. Thesis "Control of Microgrid's Voltage", Faculty of Engineering, Mansoura University, since 23 Feb. 2019.
24	N. Easa	M.Sc. Thesis "Transformer Internal Fault Detection", Faculty of Engineering, Mansoura University, since 23 Feb. 2019.
25	E. Hamza	M.Sc. Thesis "Study the Effect of High Penetration of Photovoltaic Systems in Distribution Networks", Faculty of Engineering, Mansoura University, since 16 Aug. 2019.
26	A. Bebers	M.Sc. Thesis "Detection of Internal Faults in Windings of Doubly Fed Induction Generators in Wind Farms", Faculty of Engineering, Mansoura University, since 16 Aug. 2019.
27	O. Elfedawy	Ph.D. Thesis "Analysis and Operational Control of Hybrid AC/DC Microgrids", Faculty of Engineering, Mansoura University, since 16 March 2020.
28	M. Ibrahim	Ph.D. Thesis "Study of DC Microgrid Protection", Faculty of Engineering, Mansoura University, since 13 Aug. 2020.
29	M. Elshafhy	M.Sc. Thesis "Study of Distributed Generation effect on The Transients Phenomena in Electrical Distribution Systems", Faculty of Engineering, Mansoura University, since 13 Aug. 2020.



المشاريع الطلابية بالمعمل



1. "Fault Transients in Series Compensated Overhead Transmission Lines Using EMTP/ATP", Mansoura University, 2005.
2. "Energizing Transients in an Overhead Transmission Line and Under Ground Cable Composite Circuit Using ATPDRAW", Mansoura University, 2006.
3. "Modeling of Power Quality Using ATPDRAW", Mansoura University, 2007.
4. "Integrating Power Quality Analysis and Protection Relay Functions", Mansoura University, 2009.
5. "Effect of FACTS Devices on Protection System of Wind Farms", Mansoura University, 2010.
6. "Transient Analysis of Electric Power System Using ATP-EMTP", Mansoura University, 2010.
7. "Simulation of Digital Relay for Power Transformer", Mansoura University, 2010.
8. "Distance Relay Performance Evaluation Applied to Transmission Lines With FACTS", Mansoura University, 2011.
9. "Study of Zero Sequence Currents in Distribution Cable System", Mansoura University, 2011.
10. "Study of FACTS Impact on the Transmission Lines Protection Connected to DCCPP", Mansoura University, 2012.
11. "Wireless Energy Transfer", Mansoura University, 2012.
12. "Study the impact of FACTS on the Distance protection of Transmission Systems", Mansoura University, 2013.
13. "Study the impact of FACTS on the protection of Distribution Systems", Mansoura University, 2013.
14. "HVDC Modeling Using ATP", Mansoura University, 2013.
15. "Protection of Wind Farms", Mansoura University, 2014.
16. "Electrical Protection of Wind Farms", Mansoura University, 2015.
17. "Protection Design for Distribution Power System including DG-Based Wind Turbine", Mansoura University, 2017.
18. "Protection of Microgrids", Mansoura University, 2018.
19. "Study of Transients Phenomena in Microgrids", Mansoura University, 2018.
20. "Protection System Design for Microgrids", Mansoura University, 2019.
21. "Protection Coordination in Microgrids", Mansoura University, 2020.



الاتجاهات البحثية للمعمل



- Performing experiments on the different stages of electrical energy from the moment of generation to feeding the loads.
- Testing and calibrating relays used in protecting electrical networks and equipment.
- Transient Analysis of Power Systems
- Power System Protection
- Reactive Power Control
- Power System Modeling and Analysis
- Power Quality
- Microgrids (MGs) Protection
- DG Impact in Distribution Systems



التجارب العملية بالمعمل



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No	Exp. Name	Experiment aim and description
1	Electric Power Generation	This experiment demonstrates Electric Power Generation using DC machine as a prime mover and synchronous machine as a generator.
2	Electric Power Generation Protection	This experiment demonstrates Electric Power Generation protection from the following: <ul style="list-style-type: none">• Phase balance protection: protection against phase loss, phase reverse and under voltage.• Frequency protection: protection against under and over frequency.• Reverse power protection: protection against phase a synchronization.• Overload protection: protection against overcurrent
3	Electric Power Systems Synchronization	This experiment demonstrates synchronization of two power generation systems through three different methods: synchroscope, synchro-check relay and synch lamp method. The main power system is used as a reference and it is synchronized with the synchronous generator. For two systems to be synchronized, they should have the same phase angle, voltage and frequency.
4	Step up of Electric Power system	This experiment demonstrates Step up of electric Power Generation using three-phase transformer 208/380V.
5	Electric Power Step up Protection	This experiment demonstrates Electric Power Step up Protection from reverse power, overload and under/over voltage.
6	Electric power Transmission	This experiment demonstrates how medium and long transmission lines works. As well as applying line to earth fault on a transmission line.
7	Step-Down Substation Module	Understanding the how the step-down is divided into a scheme known as Double Bus Bar Single Breaker Scheme.
8	Step-Down Substation Protection Module	Understanding how to perform the protection of the step-down substation.
9	Over/ Under Load Voltage Protection	Understanding how to perform the protection in the case of Over/Under Load Voltage.
10	Load Power Factor Protection	Understanding how to perform the protection against the power factor loss of the load.

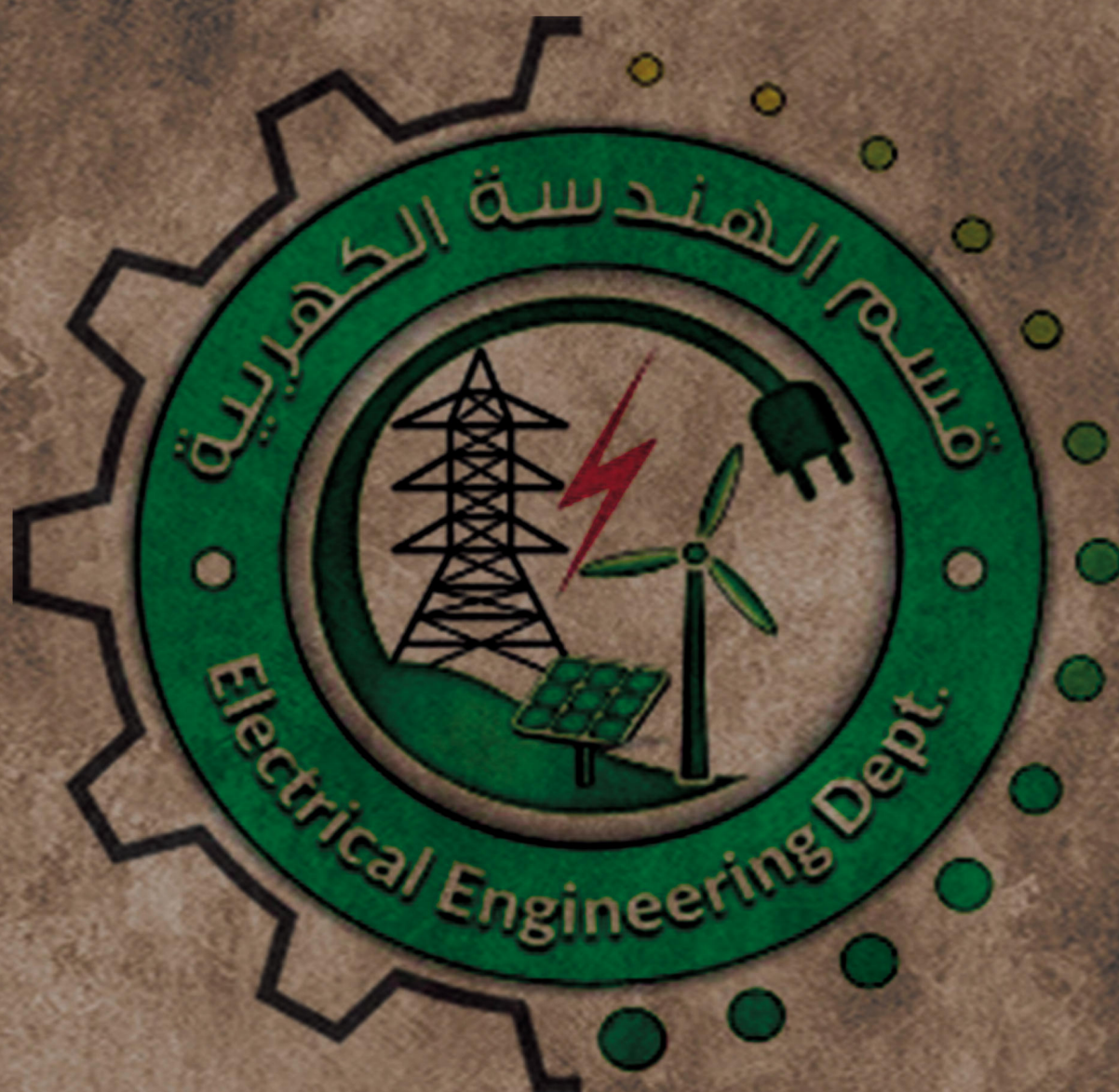


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11	Phase Balance Protection	Understanding how to perform the protection against Phase loss, Reverse of the phases, and under load Voltage.
12	Over Current Protection	Understanding how to perform the protection against Over Load Current.
13	Mechanical Load Protection	Understanding how to identify the power factor of the mechanical output of the induction motor.
14	Measuring Current and Voltage of a Static Load	Understanding how to measure the electrical parameters of different loads such as: <ul style="list-style-type: none">• Voltage• Current• Power Factor• Active Power• Reactive Power
15	Measuring Current and Voltage of a Dynamic Load	Understanding how to measure the electrical parameters of the dynamic loads such as:
16	Generating DC voltage	This experiment demonstrates how DC voltage is generated through three-phase rectifier.
17	Generating Faults	This experiment demonstrates line to line and line to earth faults generation and simulation.
18	Dynamometer Braking	This experiment demonstrates braking using electromagnetism principle. The DC machine is used as a generator and the induction machine is used as a motor. The efficiency of induction motor is calculated through the experiment.

Electrical Power and Machines Engineering Program



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