



1ST PERIOD

CEG001 - TECHNICAL DRAWING I

Syllabus: Drawing instruments. Fundamental geometric constructions. ABNT Technical Standards. Main and auxiliary orthographic views. Sectional views. Dimensioning and scales. Representation of solids in axonometric perspective. Sketches. Basic notions of CAD.

Bibliography

1. ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS (ABNT). **NBR17006: Technical drawing —**
2. Requirements for representation of projection methods. Rio de Janeiro: ABNT, 2021.
3. ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS (ABNT). **NBR16752 - Technical drawing —**
4. Requirements for presentation on drawing sheets. Rio de Janeiro: ABNT, 2020.
5. ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS (ABNT). **NBR16861 - Technical drawing —**
6. Requirements for representation of lines and writing. Rio de Janeiro: ABNT, 2020.
7. ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS (ABNT). **NBR10126 - Dimensioning in technical drawing — Procedure.** Rio de Janeiro: ABNT, 1987.
8. FRENCH, Thomas E.; VIERCK, Charles J. Technical drawing and graphic technology. 8th ed. São Paulo:
9. Globo, 2005.
10. SILVA, Arlindo; RIBEIRO, Carlos T.; DIAS, João; SOUSA, Luís. Modern Technical Drawing, 4th ed. São
11. Paulo: Grupo GEN-LTC, 2006. Available at:
[https://integrada.minhabiblioteca.com.br/#/books/978-85-](https://integrada.minhabiblioteca.com.br/#/books/978-85-216-2739-5/)
12. 216-2739-5/. Accessed on: 18 Feb. 2022.

Complementary Bibliography



1. GILL, Robert W. **Drawing for project presentation: for architects, engineers, industrial designers, decorators, advertisers, landscapers, and general artists.** Rio de Janeiro: Ediouro, 1981.
2. LEAKE, James M.; BORGERSON, Jacob L. **Technical Drawing Manual for Engineering.** São Paulo:
3. Grupo Gen-LTC, 2015.
4. MANFÉ, Giovanni. **Mechanical technical drawing: complete course for technical schools and basic cycle of engineering faculties.** São Paulo: Hemus, 2004.
5. MICELI, Maria Teresa. **Basic technical drawing.** 4th ed. Rio de Janeiro: Imperial Novo Milênio, 2010.
6. FEDERAL UNIVERSITY OF PARANÁ - CNPJ 75.095.679/0001-49
7. MONTENEGRO, Gildo A. **Architectural drawing.** 5th ed. São Paulo: Blücher, 2017.
8. MORIOKA, Carlos A.; CRUZ, Michele David. **Technical Drawing - Measures and Graphic Representation.** São
9. José dos Campos: Editora Saraiva, 2014. Available at:
10. <https://integrada.minhabiblioteca.com.br/#/books/9788536518350/>. Accessed on: 18 Feb. 2022.
11. TULER, Marcelo; WHA, Chan K. **AutoCAD exercises: activity guide.** Porto Alegre: Bookman,
12. 2013. Available at:
<https://integrada.minhabiblioteca.com.br/#/books/9788582600528/>. Accessed on: 24 Feb. 2022.

C1180 - COMPUTER PROGRAMMING

Syllabus: Computer history: Notions of computer components. Brief history. See TREMBLAY, P., 1981. Program Structure: Program identification, declaration block (constants, types, variables, subprograms), command block. Elements of C/C++ Language: Language elements, letters, digits, symbols, reserved words, identifiers, delimiters, user-defined elements, identifiers, comments, indentation. Data Types: Integer type (INT), real type



(FLOAT), character type (CHAR). Commands: Statements, simple commands, assignment commands, input (read) and output (write) commands. Structured commands: decisions (IF/ELSE, SWITCH/CASE). Structured commands: iteration (WHILE, DO/WHILE, FOR). Subprograms: Procedures, variable scope, parameter passing (by value and by reference), functions. Arrays: One-dimensional and multidimensional arrays, strings. Sorting algorithms. Search algorithms. Programming exercises in all topics. History. Elements of a programming language. Data Types. Program structure. Simple and structured commands. Procedures and functions. Array and structured type. Examples of classic algorithms.

Bibliography

1. KERNIGHAN, B., Ritchie, D., C: The Programming Language - ANSI Standard, Editora Campus, 1989.
2. MIZRAHI, V. V., Training in C Language. Prentice Hall Brasil, 2008.
3. TREMBLAY, P., Computer Science, McGraw--Hill, 1981

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4. SCHILDT, H., Complete C Makron Books, 1997.
5. MEDINA, M., FERTIG, C., Algorithms and Programming: Theory and Practice. 2nd edition. Novatec Editora Ltda., 2006.
6. SALVETI, D.D., BARBOSA, L.M., Algorithms. Makron Books do Brasil, 1998.
7. KNUTH, D.E., The Art of Computer Programming, Addison-Wesley, 2005.
8. STROUSTROUP, B., The C++ Programming Language (4th ed.), Addison-Wesley, 2013.

CM303 - INTRODUCTION TO ANALYTICAL GEOMETRY AND LINEAR ALGEBRA



Syllabus: Linear systems and matrices. Vectors in the plane and space. Dot product and cross product. Eigenvalues and Eigenvectors of matrices. Coordinate changes. Conics in the plane.

Bibliography

1. WINTERLE, P. - Vectors and Analytical Geometry, Makron Books, São Paulo, 2000.
2. ANTON, H., RORRES, C. - Linear Algebra with Applications, Bookman, Porto Alegre, 2012.
3. LEON, S. - Linear Algebra: with Applications, 4th ed., LTC Rio de Janeiro, 1999.

Complementary Bibliography

1. SANTOS, R. - Matrices, Vectors and Analytical Geometry, Belo Horizonte, UFMG Press, 2010.
2. LIPSCHUTZ, S. - Linear Algebra, 3rd ed., Makron Books, São Paulo, 1994.
3. STEINBRUCH, A. e WINTERLE, P. - Linear Algebra, 2nd ed., Unificado, Curitiba, 200-
4. STRANG, G. - Introduction to Linear Algebra, GEN, São Paulo, 2013.
5. STEINBRUCH, A. e WINTERLE, P. - Introduction to Linear Algebra, McGraw-Hill, São Paulo, 1990.

CM310 - PRE-CALCULUS

Syllabus: Real numbers and operations. Functions, composition of functions, inverse function, and graphs of functions. Polynomial, rational, modular, exponential, logarithmic, and trigonometric functions. Equations and inequalities involving functions.

Bibliography



1. DEMANA, FRANKLIN D.; WAITS BERT K. ; FOLEY, GREGORY D.; KENNEDY . PRE-
2. CALCULUS:GRAPHIC, NUMERIC AND ALGEBRAIC. 2ND EDITION. PEARSON; 2013.
3. IEZZI, G., ET AL, COLLECTION FUNDAMENTALS OF ELEMENTARY MATHEMATICS. VOL. 1, 2 AND 3.
4. 9TH EDITION. EDITORA ATUAL, 2013.
5. STEWART, J., CALCULUS - VOL. 1, 7TH EDITION, CENGAGE LEARNING, SÃO PAULO, 2013.

Complementary Bibliography

1. ROMANO, R., DIFFERENTIAL AND INTEGRAL CALCULUS, VOL 1, ED. ATLAS, CHAPTERS 0 TO 3.
2. H.L. GUIDORIZZI, A COURSE OF CALCULUS, VOL 1, ED. LTC, 5TH EDITION, CHAPTERS 1 AND 2
3. DO CARMO, M. P., MORGADO, A. C. E WAGNER, E., TRIGONOMETRY AND COMPLEX NUMBERS,
4. COLLECTION OF THE MATHEMATICS TEACHER, SBM, RIO DE JANEIRO, 1992.
5. LIMA, ELON LAGES. REAL NUMBERS AND FUNCTIONS . COLLECTION PROFMAT. 1ST EDITION.
6. EDITORA SBM RIO DE JANEIRO, 2013.
7. NIVEN, IVAN. NUMBERS: RATIONAL AND IRRATIONAL. EDITORA SBM, RIO DE JANEIRO 2012.
8. MEDEIROS, VALERIA. PRE CALCULUS. CENGAGE; 3RD EDITION: 2013.



Syllabus: Scientific methodology. Types of research, objectives, approach, design, evaluation of results. ABNT standards. Reading and production of technical and scientific texts. Communication and Expression for Engineers.

Bibliography

1. KÖCHE, J. C. Fundamentals of scientific methodology: theory of science and research practice, 34 ed.,
Petrópolis (RJ): Vozes, 2015, 182 p. ISBN 9788532618047.
2. FIGUEIREDO, N. A. Method and methodology in scientific research, 3 ed., São Caetano do Sul (SP):
Difusão, 2008, 247 p. ISBN 9788577280858.
3. AMADEU, M.S.U.S. et al. Manual for standardizing scientific documents : according to ABNT standards, Curitiba: Ed. UFPR, 2015, 327 p. ISBN 978-85-8480-002-5.

Complementary Bibliography

1. SALOMON, D. V. The wonderful uncertainty: dialectical methodology essay on problematization in the
process of thinking, researching, and creating, 2. ed. São Paulo: Martins Fontes, 2006, 412 p. ISBN 8533621728.
2. SILVA, R.S.R.M.; FURTADO, J.A.P.X. The monograph in undergraduate practice: how to prepare a final course work - TCC, Teresina: CEUT, 2002, 114 p. ISBN 8588996014.
3. BASEIO, M.A.F. et al. Scientific Methodology, 2 ed., São Paulo: Copacabana, 2014, 106 p. ISBN 9788563912114.
4. OLIVEIRA NETTO, A.A. Scientific research methodology: practical guide for presenting academic works, 2. ed. Florianópolis: VisualBooks, 2006, 174 p. ISBN 8575021974.
5. MEDEIROS, J.B. Scientific Writing: The practice of annotations, summaries, reviews, 7 ed., São Paulo: Atlas, 2005, 326 p. ISBN 8522441057.



TE365 - INTRODUCTION TO EXTENSION IN ELECTRICAL ENGINEERING

Syllabus: History of the Brazilian university: teaching, research, and university extension. Introduction to university extension: foundations, theories, and social role of university extension. Legislation of university extension. Methodological, didactic, and technical-scientific procedures. Steps for the elaboration of university extension activities and projects. Applications in Electrical Engineering.

Bibliography

1. SOUSA, A. L. – The History of University Extension, Editora Alinea, 2010
TAVARES, C.A.R.; FREITAS, K.S. - University Extension: The Ugly Duckling of Academia?, 1st edition. Paco Editorial, 2016 FORUM OF PRO-REKTORS OF EXTENSION OF BRAZILIAN PUBLIC UNIVERSITIES. National Plan for University Extension. Ilhéus; Editus, 2001. 65p. (University Extension Collection; v. 1).
GONÇALVES, H.A. - Manual of University Extension Projects, Editora Avercamp, 2008.

Complementary Bibliography

1. SIVERES, L. - University Extension as a Learning Principle, Liber Livro, 2013.
2. DE SOUZA, D. T.; MORENO, A.; NEVES, C.A.N.; VIEIRA, L.B. – Practices and Reflections in University Extension, Editora UFV, 2017.
3. SOUSA, A. I. P.; FELIPE, R.M.S.; STRANIERI, R.E.; SOUZA, I.P.;
4. FACUNDO, V. e dos SANTOS, R. Extension: the university plugged into the community, 1st ed., Editora Itacaúnas, 2018.
5. GUÉRIOS, E.; STOLTZ, T. - Education and University Extension Research and Teaching, 1st ed., Juruá, 2017.



6. SANTOS, B.S. University of the 21st Century: for a democratic and emancipatory reform of the University. São Paulo: Cortez, 2004. 120p. (Collection issues of our time; v. 120).

TQ190 - INTRODUCTION TO ELECTROCHEMISTRY

Syllabus: Periodic classification of elements: Fundamental Concepts, electrons in atoms, periodic table, bonding forces and energies. Ions. **Electrochemical Reactions:** Electrochemical considerations, standard electrode potential, spontaneity of corrosion reactions, oxidants and corrosion reactions. **Galvanic and electrolytic cells, Batteries:** General considerations and types of batteries. **Corrosion:** Basic mechanisms, corrosion rate estimation, passivity, corrosive media, galvanic corrosion, electrolytic corrosion, selective corrosion, corrosion rate polarization-passivation, corrosion prevention. **Cathodic Protection:** Mechanisms, Cathodic protection systems and applications. **Industrial applications of electrochemistry.**

Bibliography

1. CALLISTER, W.D. Materials science and engineering - An introduction, John Wiley, 1994.
2. VAN VLACK, L.H. Principles of materials science and technology, Campus, 1983.
3. GENTIL, V. Corrosion (4th edition), LTC, 2003.

Complementary Bibliography

1. GEMELLI, E. Corrosion of metallic materials and its characterization, LTC, 2001.
2. NEWELL, J. Fundamentals of modern materials engineering and science, LTC, 2010.
3. CHIAVERINI, V. Mechanical technology (Volumes I and II), McGraw Hill, 1986.
4. ASKELAND, D.R.; PHULÉ, P.P. Materials science and engineering (1st edition), Cengage Learning, 2008.



5. SHACKELDFORD, J.F. Introduction to materials science of Engineers (4th edition). Prentice-Hall, 1996.

2ND PERIOD

CF109 - PHYSICS I

Syllabus: Physical quantities. Vectors. Kinematics in one dimension. Motion in one or more dimensions. Particle dynamics and Newton's laws. Work and energy. Conservation of mechanical energy. Systems of particles. Conservation of linear momentum. Collisions. Rotational kinematics. Rotational dynamics and conservation of angular momentum.

Bibliography

1. Halliday, D., Resnick, R.; e Walker, J.; - Fundamentals of Physics, vol. 1. 2- Tipler, P.A.; - Physics, vol.1. 3- Sears, F.; Zemanski, H.W.; e Young, H.D.; - Physics. Vol. 1.

Complementary Bibliography

1. 1- Nussenzweig, H.M. Basic Physics Course. Vol. 1. 2- Chaves, Alaor; Sampaio, J. F. Basic Physics - Mechanics, Vol. 1 3- Jewett,Jr. John W. / Serway,Raymond A. Physics For Scientists and Engineers - Vol. 1 - Mechanics. 4- Knight,Randall D. Physics - A Strategic Approach - Vol. 1 5- Feynman, Richard P. Physics In 12 Lessons - Easy and Not So Easy.

CM311 - CALCULUS 1

Syllabus: Limit and continuity. Derivatives and tangent line. Differentiation rules: linearity, product and quotient derivatives, and Chain Rule. Mean Value Theorem and Taylor's Formula with Lagrange Remainder. Maxima and minima of functions. Primitives. Integrals. Area calculation.

Bibliography



1. GUIDORIZZI, H. L. - A Course in Calculus, vol. 1 and 2, LTC, Rio de Janeiro.
2. STEWART, J. - Calculus, vol. 1, Cengage Learning, São Paulo.
3. LEITHOLD, L. - Calculus with Analytic Geometry, vol.1, Harbra, Rio de Janeiro.

Complementary Bibliography

1. APOSTOL, T. M. -Calculus, vol. 1, 2nd ed., John Wiley, New York, 1969.
2. SPIVAK, M. - Calculus, Addison Wesley, London, 1973.
3. ANTON, H. - Calculus: a new horizon, vol. 1, Bookman, Porto Alegre, 2000.
4. BOULOS, P. e ABUD, Z. I. - Differential and Integral Calculus, vol. 1, Makron Books, São Paulo, 1999.
5. EDWARDS, C. H. e PENNEY, D.E. - Calculus with Analytic Geometry, vol. 1, Prentice-Hall, São Paulo, 1997.
6. SIMMONS, G. F. - Calculus with Analytic Geometry, vol. 1, McGraw-Hill, Rio de Janeiro, 1987.
7. SWOKOWSKI, E. - Calculus with Analytic Geometry, vol. 1, Makron Books, São Paulo.
8. THOMAS, G. B. - Calculus, vol. 1, 10th ed., Pearson Addison Wesley, São Paulo, 2002

TE311 - WORKSHOP ON ELECTRICAL ENGINEERING PROJECTS

Syllabus: Implementation of an electrical engineering project. Methodology and documentation. Project management.

Bibliography

1. SCHILDT, Herbert. Complete C. 3. ed. rev. atual. São Paulo: Makron Books do Brasil, c1997. 827 p.
2. Index: p. 811-27. ISBN 8534605955 (broch.).



3. MICHAEL MARGOLIS. Copyright © 2011. 978-0-596-80247-9. O'Reilly Media, Inc. Arduino Cookbook.
4. BRUZZI, D. G., Project Management. Editora Senac, 2008.

Complementary Bibliography

1. DON WILCHER. Copyright © 2012. 978-1-4302-4266-6. Apress Inc. Learn Electronics with Arduino.
2. JOYANES AGUILAR, Luis. Programming in C++: algorithms, data structures, and objects. São Paulo:
3. McGraw-Hill, c2008, xxxi, 768 p., ii, Includes bibliography. ISBN 9788586804816 (broch.).
4. STROUSTRUP. Bjarne. The C++ programming language. 3. ed. Porto Alegre: Bookman, 2000. 823p., ii.
5. Includes index. ISBN 8573076992 (broch.).
6. SWAN, Tom. Learning C++. Rio de Janeiro: Campus, 1993. 675p. ii. Includes index. ISBN 8570017448 :
7. (enc.).
8. DEWHURST, Stephen C; STARK, Kathy T. Programming in C++. Rio de Janeiro: Campus, 1990. 249p.
9. 23 cm. Includes index. ISBN 8570016220 (broch.).

TE313 - ELECTRIC CIRCUITS I

Syllabus: Resistive Circuits. Dependent or controlled sources. Analysis Methods. Network theorems. Energy storage elements. RC and RL circuits. Second-order circuits. Electrical measurement instruments.

Bibliography



1. Fundamentals of Electric Circuits. Charles K. Alexander, Matthew N. O. Sadiku. Porto Alegre: Bookman, 2003.
2. Circuit Analysis in Engineering, Hayt, WH, Kemmerly, JE, Durbin, SM, 7th ed., McGraw-Hill, 2008.
3. Fundamentals of Electric Circuit Analysis. Johnson, Hibern e Johnson. Rio de Janeiro: Prentice-Hall do Brasil, 1994.

Complementary Bibliography

1. Introduction to Circuit Analysis. Robert L. Boylestad. Rio de Janeiro: Prentice-Hall, 1998.
2. Electric Circuits. James W. Nilsson, Susan A. Riedel. Rio de Janeiro: Livros Técnicos e Científicos, 2003.
3. Electric Circuits. Joseph A. Edminster. Rio de Janeiro: MacGraw-Hill, 1972.
4. Electric Circuits. Luiz de Queiroz Orsini. São Paulo: E. Blucher; USP, 1971.
5. Electric Circuits. Yaro Burian Junior. Rio de Janeiro: Almeida Neves, c1977.

TE314 - DIGITAL ELECTRONICS

Syllabus: Number systems and codes. Boolean Algebra. Logic gates. Representation and minimization of logic functions. Combinational and sequential digital systems. Flip-flops. Registers and Counters. Arithmetic circuits. Memory devices. Logic families and Integrated Circuits.

Bibliography

1. TOCCI, Ronald J.; WIEDMER, Neal S.; MOSS, Gregory L. Digital Systems - Principles and Applications ; Pearson.
2. PEDRONI, Volnei A. Modern Digital Electronics and VHDL. Editora Campus 2010.
3. MALVINO, Albert P.; LEACH, Donald P. Digital Electronics - Principles and Applications. Vol. I and II. São Paulo: McGraw-Hill.



Complementary Bibliography

1. NELSON, Victor P. NAGLE, H. Troy; IRWIN, David; CARROLL, Bill. Digital Logic Circuit Analysis & Design. Prentice Hall.
2. BREEDING, Kenneth J. Digital Design Fundamentals. Prentice Hall, 1996.
3. TAUB, Herbert; SCHILLING, Donald. Digital Electronics. Mc Graw Hill.
4. COMER, David J. Digital Logic State Machine Design. Mc Graw Hill.
5. BIGNELL, James W; DONOVAN, Robert. Digital Electronics, Cengage Learning, 2009.

TE316 - ELECTRIC CIRCUITS LABORATORY I

Syllabus: Practical activities covering the following topics. Resistive Circuits. Dependent or controlled sources. Analysis Methods. Network theorems. Energy storage elements. RC and RL circuits. Second-order circuits. Electrical measurement instruments.

Bibliography

1. Fundamentals of Electric Circuits. Charles k. Alexander, Matthew N. O. Sadiku. Porto Alegre : Bookman, 2003.
2. Circuit Analysis in Engineering, Hayt, WH, Kemmerly, JE, Durbin, SM, 7th ed., McGraw-Hill, 2008.
3. Fundamentals of Electric Circuit Analysis. Johnson, Hibum e Johnson. Rio de Janeiro: Prentice-Hall do Brasil, 1994.

Complementary Bibliography

1. Introduction to Circuit Analysis. Robert L. Boylestad. Rio de Janeiro: Prentice-Hall, 1998.
2. Electric Circuits. James W. Nilsson, Susan A. Riedel. Rio de Janeiro: Livros Técnicos e Científicos, 2003.
3. Electric Circuits. Joseph A. Edminister. Rio de Janeiro: McGraw-Hill, 1972.



4. Electric Circuits. Luiz de Queiroz Orsini. São Paulo: E. Blucher, USP, 1971.
5. Electric Circuits. Yaro Burian Junior. Rio de Janeiro: Almeida Neves, c1977.

TE317 - DIGITAL ELECTRONICS LABORATORY

Syllabus: Practical activities covering the following topics: Logic functions. Boolean algebra. Number systems. Binary codes. Combinational circuits. Memory circuits. Sequential circuits.

Bibliography

1. TOCCI, Ronald J.; WIEDMER, Neal S.; MOOS, Gregory L. Digital Systems - Principles and Applications: Pearson.
2. PEDRONI, Volnei A. Modern Digital Electronics and VHDL. Editora Campus 2010.
3. MALVINO, Albert P; Leach, Donald P. Digital Electronics - Principles and Applications. Vol. I and II. São Paulo: McGraw-Hill.

Complementary Bibliography

1. NELSON, Victor P.; NAGLE, H. Troy; IRWIN, David; CARROL, Bill. Digital Logic Circuit Analysis & Design.
2. Prentice Hall.
3. BREEDING, Kenneth J. Digital Design Fundamentals. Prentice Hall, 1996.
4. TAUB, Herbert; SCHILLING, Donald. Digital Electronics. Mc Graw-Hill.
5. COMER, David J. Digital Logic State Machine Design. Mc Graw-Hill.
6. BIGNELL, James W.; DONOVAN, Robert. Digital Electronics. Cengage Learning, 2009.

TE371 - EXTENSION PROJECT A



Syllabus: Supervised participation in extension actions related to the Electrical Engineering course and linked to an extension program, extension project, or institutional programs that have regulation and their own evaluation committees and comply with the extension principles.

Bibliography

1. SOUSA, A. L. – The History of University Extension, Editora Alínea, 2010
2. TAVARES, C.A.R.; FREITAS, K.S. - University Extension: The Ugly Duckling of Academia?, 1st edition. Paco Editorial, 2016
3. FORUM OF PRO-REKTORS OF EXTENSION OF BRAZILIAN PUBLIC UNIVERSITIES. National Plan for
4. University Extension. Ilhéus; Editus, 2001. 65p. (Collection Extension Universitária; v. 1).
5. GONÇALVES, H.A. - Manual of University Extension Projects, Editora Avercamp, 2008.

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1. SIVERES, L. - University Extension as a Learning Principle, Liber Livro, 2013.
2. DE SOUZA, D. T.; MORENO, A.; NEVES, C.A.N.; VIEIRA, L.B. – Practices and Reflections in University Extension, Editora UFV, 2017.
3. SOUSA, A. I. P.; FELIPE, R.M.S.; STRANIERI, R.E.; SOUZA, I.P.;
4. FACUNDO, V. e dos SANTOS, R. Extension: the university plugged into the community, 1st ed., Editora Itacaidnas, 2018.
5. GUÉRIOS, E.; STOLTZ, T. - Education and University Extension Research and Teaching, 1st ed., Juruá, 2017.
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Syllabus: Supervised participation in extension actions related to the Electrical Engineering course and linked to an extension program, extension project, or institutional programs that have regulation and their own evaluation committees and comply with the extension principles.

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1. SOUSA, A. L. – The History of University Extension, Editora Alínea, 2010;
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3. FORUM OF PRO-REKTORS OF EXTENSION OF BRAZILIAN PUBLIC UNIVERSITIES. National Plan for University Extension. Ilhéus; Editus, 2001. 65p. (Collection Extension Universitária; v. 1);
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1. SIVERES, L. - University Extension as a Learning Principle, Liber Livro, 2013;
2. DE SOUZA, D. T.; MORENO, A.; NEVES, C.A.N.; VIEIRA, L.B. – Practices and Reflections in University Extension, Editora UFV, 2017;
3. SOUSA, A. I. P.; FELIPE, R.M.S.; STRANIERI, R.E.; SOUZA, I.P.;
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5. GUÉRIOS, E.; STOLTZ, T. - Education and University Extension Research and Teaching, 1st ed., Juruá, 2017;
6. SANTOS, B.S. University of the 21st Century: for a democratic and emancipatory reform of the University. São Paulo: Cortez, 2004. 120p. (Collection issues of our time; v. 120).

3RD PERIOD

CF110 - PHYSICS II



Syllabus: Gravitation. Fluid statics. Dynamics of ideal fluids. Oscillations. Waves in elastic media. Sound waves. Temperature. Heat and first law of Thermodynamics. Kinetic theory of gases. Entropy and second law of Thermodynamics.

Bibliography

1. Halliday, David; Resnick, Robert; Krane, Kenneth S. Physics II ? 4th edition, LTC ? Livros Técnicos e
2. Científicos ? editora S.A, 1996. 2- Tripler, Paul; Physics for Scientists and Engineers V. II, LCT ? Livros
3. Técnicos e Científicos ? editora S.A, 1995. 3-Young, H. D; Freedman, R. A; Physics II- Waves and
4. Thermodynamics-Pearson, Addison Wesley, 2007.

Complementary Bibliography

1. Moysés Nussenzveig, H. Basic Physics Course vol II, 2nd edition, editora Edgard Blucher LTDA, 1990.
2. Chaves, A. S. Basic Physics-Gravitation, Fluids, Waves and Thermodynamics, LTC editora, 1st edition,
3. 2007. 3- Jewett,Jr. John W. / Serway,Raymond A. Physics For Scientists and Engineers-Vol. 2 4-
4. Knight,Randall D. Physics - A Strategic Approach - Vol. 2 5- Feynman, Richard P. Physics In 12 Lessons - Easy and Not So Easy.

CF113 - EXPERIMENTAL PHYSICS I

Syllabus: Physical measurements and experimental errors. Classical Mechanics experiments. Thermodynamics and Mechanical Waves.

Bibliography



1. Goldenbert, J., "General and Experimental Physics", E. Univ. São Paulo ? USP, (1968), Vol I. 2 -
2. Fundamentals of Physics; D. Halliday e R. Resnick, 8th ed., Edit. LTC Ltda. Rio de Janeiro (2009), Vol. 1. 3 -
3. Fundamentals of Physics; D. Halliday e R. Resnick, 8th ed., Edit. LTC Ltda. Rio de Janeiro (2009), Vol. 2.

Complementary Bibliography

1. 1- Tríola, M. F., "Introduction to Statistics", 10th Edition, Livros Técnicos e Científicos, (2008), Rio de Janeiro.
2. 2- "Physics"; Sears, Zemansky e Young; 2nd ed., Edit. LTC Ltda. Rio de Janeiro (1983), Vols. 1 e 2.
3. 3 ? Introduction to Observation Adjustment; C. Gemael, A. M. L. Machado e R. Wandresen; 2nd ed.,
4. Editora UFPR. Curitiba (2015). 4 - Fundamentals of Physics; D. Halliday e R. Resnick, 8th ed., Edit. LTC Ltda.
5. Rio de Janeiro (2009), Vol. 1. 5 - Fundamentals of Physics; D. Halliday e R. Resnick, 8th ed., Edit. LTC Ltda. Rio de Janeiro (2009), Vol. 2.

C1181 - NUMERICAL METHODS

Syllabus

1. Representation of Real Numbers and Errors.
2. Zero of Non-linear Equations: bisection, fixed point, Newton-Raphson, Secant methods.
3. Solution of Systems of Linear Equations: direct methods (Gauss Elimination, Jordan), and iterative methods (Gauss-Jacobi, Gauss-Seidel, Relaxation).
4. Interpolation. Linear, quadratic, and Lagrange methods. Newton's method with divided differences. Gregory-Newton method



5. Curve fitting. Least squares method.
6. Numerical Integration. Trapezoidal and Simpson's methods.
7. Exercises on solving practical problems.

Matrices. Linear systems. Solutions of linear systems. Zeros of algebraic and transcendental functions. Interpolation. Integration.

Bibliography

1. D. D. Salvetti. Elements of Numerical Calculus. Companhia Editora Nacional, 1976.
2. M.A.G Ruggiero e V.L.R Lopes. Numerical Calculus: Theoretical and Computational Aspects. 2nd Edition. Pearson Makron Books, 1996.
3. M. Cristina C. Cunha. Numerical Methods. 2nd. edition. Editora Unicamp, 2000.

Complementary Bibliography

1. L.C. Barroso. Numerical Calculus. Harper & Row, 1983.
2. S.D. Conte. Elements of Numerical Analysis. Editora Globo, 1977.
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CM312 - CALCULUS 2

Syllabus: Integration techniques. Improper integrals. Real and vector functions of several variables. Limit and continuity. Differentiability. Higher-order derivatives. Maxima and minima. Applications.

Bibliography



1. GUIDORIZZI, H. L. - A Course in Calculus, vols. 2 e 3, LTC, Rio de Janeiro.
2. STEWART, J. - Calculus, vol. 2, Cengage Learning, São Paulo, 2010.
3. LEITHOLD, L. - Calculus with Analytic Geometry, vol. 2, Harbra, Rio de Janeiro.

Complementary Bibliography

1. APOSTOL, T. M. -Calculus, vol. 2, 2ed., John Wiley, New York, 1969.
2. SIMMONS, G. F. - Calculus with Analytic Geometry, vol.2. McGraw-Hill, Rio de Janeiro, 1987.
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6. BOULOS, P. e ABUD, Z. I. - Differential and Integral Calculus, vol. 2, Makron Books, São Paulo, 2000.
7. EDWARDS, C. H. e PENNEY, D.E. - Calculus with Analytic Geometry, vol. 2, Prentice-Hall, São Paulo, 1997.

TE324 - ANALOG ELECTRONICS I

Syllabus: Semiconductor devices. Diode: types and characteristics. Diode circuits. Field-effect and bipolar transistors: characteristics, biasing, small-signal analysis. Transistor as amplifier and switch. Ideal operational amplifier.

Bibliography

1. SEDRA, Adel S; SMITH, Kenneth C. Microelectronics. 5. ed. São Paulo: Pearson / Prentice Hall, c2007. xiv, 848 p., ii. Includes bibliography and index. ISBN 9788576050223 (broch.).
2. RAZAVI, Behzad. Fundamentals of microelectronics. Rio de Janeiro: LTC, 2010. 728p., ii. Includes references and index. ISBN 9788521617327 (broch.).



3. BOYLESTAD, Robert L.; NASHELSKY, Louis. Electronic devices and circuit theory. 8. ed. São Paulo: Pearson Education do Brasil, c2004. xviii, 672p.

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1. Richard C. Jaeger, Travis N. Blalock, Microelectronic circuit design — 4th ed. McGraw-Hill, 2011
2. Anant Agarwal and Jeffrey H. Lang; Foundations of Analog and Digital Electronic Circuits; Elsevier, 2005
3. G. J. Deboo and C. N. Burrous; Integrated Circuits and Semiconductor Devices, McGraw Hill, 1987
4. F. Maloberti, Understanding Microelectronics: A Top-Down Approach, Wiley, UK, 2012.
5. GRAY, Paul R.; MEYER, Robert G. Analysis and design of analog integrated circuits. 3rd. ed. New York: J. Wiley, c1993. 792p., il. ISBN 0471574953 (enc.).

TE326 - ANALOG ELECTRONICS LABORATORY I

Syllabus: Practical activities covering the following topics. Semiconductor devices. Diode: types and characteristics. Diode circuits. Field-effect and bipolar transistors: characteristics, biasing, small-signal analysis. Transistor as amplifier and switch. Ideal operational amplifier.

Bibliography

1. SEDRA, Adel S; SMITH, Kenneth C. Microelectronics. 5. ed. São Paulo: Pearson / Prentice Hall, c2007. xiv, 848 p., il. Includes bibliography and index. ISBN 9788576050223 (broch.).
2. RAZAVI, Behzad. Fundamentals of microelectronics. Rio de Janeiro: LTC, 2010. 728p., il. Includes references and index. ISBN 9788521617327 (broch.).



3. BOYLESTAD, Robert L.; NASHELSKY, Louis. Electronic devices and circuit theory. 8. ed. São Paulo: Pearson Education do Brasil, c2004. xviii, 672p., il., tabs. Appendix. ISBN 8587918222 (Broch.).

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1. Richard C. Jaeger, Travis N. Blalock, Microelectronic circuit design — 4th ed. McGraw-Hill, 2011
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4. F. Maloberti, Understanding Microelectronics: A Top-Down Approach, Wiley, UK, 2012.
5. GRAY, Paul R.; MEYER, Robert G. Analysis and design of analog integrated circuits. 3rd. ed. New York: J. Wiley, c1993. 792p., il. ISBN 0471574953 (enc.).

TE337 - ELECTRICAL MATERIALS

Syllabus: Composition, state, structure, classification, properties, transformations, and applications in Electrical Engineering of conductive, insulating, magnetic, semiconductor, and optical materials.

Bibliography

1. VAN VLACK, Laurence Hall. Principles of Materials Science, Ed. Campus.
2. RETHWISCH, David G.; CALLISTER JR., William D. Materials Science and Engineering; an introduction, Ed. LTC, 8th Edition, 2012.
3. Callister Jr., W.D., Materials Science and Engineering, an Introduction, 7th Edition, Ed. Guanabara, 2008.

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1. SMITH, William F. Principles of Materials Science and Engineering. 3rd Ed. , McGraw-Hill Interamericana, 2006.
2. Newell, James. Fundamentals of Modern Engineering and Materials Sciences. LTC Ed.
3. CHIAVERINI, V., Mechanical Technology, Vol. I e III. McGraw–Hill.
4. Askeland, Donald R, Phulé, P.P.; Materials Science and Engineering, 1st Edition, Ed. Cengage Learning, 2008.
5. Shackelford, James F. Introduction to Materials Science for Engineers. New Jersey, Prentice-Hall, Inc., 4th Ed. 1996.

TE373 - EXTENSION PROJECT C

Syllabus

Supervised participation in extension actions related to the Electrical Engineering course and linked to an extension program, extension project, or institutional programs that have regulation and their own evaluation committees and comply with the extension principles.

Bibliography

1. SOUSA, A. L. – The History of University Extension, Editora Alinea, 2010;
2. TAVARES, C.A.R.; FREITAS, K.S. - University Extension: The Ugly Duckling of Academia?, 1st edition. Paco Editorial, 2016;
3. FORUM OF PRO-REKTORS OF EXTENSION OF BRAZILIAN PUBLIC UNIVERSITIES. National Plan for University Extension. Ilhéus; Editus, 2001. 65p. (Collection University Extension; v. 1);
4. GONÇALVES, H.A. - Manual of University Extension Projects, Editora Avercamp, 2008.

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1. SIVERES, L. - University Extension as a Learning Principle, Liber Livro, 2013;
2. DE SOUZA, D. T.; MORENO, A.; NEVES, C.A.N.; VIEIRA, L.B. – Practices and Reflections in University Extension, Editora UFV, 2017;
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4. FACUNDO, V. e dos SANTOS, R. Extension: the university plugged into the community, 1st ed., Editora Itacaidnas, 2018;
5. GUÉRIOS, E.; STOLTZ, T. - Education and University Extension Research and Teaching, 1st ed., Juruá, 2017;
6. SANTOS, B.S. University of the 21st Century: for a democratic and emancipatory reform of the University. São Paulo: Cortez, 2004. 120p. (Collection issues of our time; v. 120).

4TH PERIOD

CE009 - INTRODUCTION TO STATISTICS

Syllabus: Descriptive and Exploratory Statistics. Probabilities and Random Variables. Statistical Inference: Estimation and Hypothesis Testing. Applications.

Bibliography

1. BUSSAB, W.O.; MORETTIN, P.A. Basic Statistics. São Paulo: Editora Saraiva
2. MAGALHÃES, M.N.; LIMA, A.C.P. Notions of Probability and Statistics. São Paulo: EDUSP
3. TRICLA, M. F. Introduction to Statistics. Rio de Janeiro: Editora LTC

Complementary Bibliography

1. SOARES, J.F.; FARIA, A.A.; CÉSAR, C.C. Introduction to Statistics. Rio de Janeiro: Editora LTC
2. PAGANO, M.; GAUVREAU, K. Principles of Biostatistics. São Paulo: Thomson
3. COSTA NETO, P. L. de O. Statistics. São Paulo: Editora Edgard Blücher Ltda
4. MEYER, P. L. Probability: applications to statistics. Rio de Janeiro: LTC



5. COSTA NETO, P.L. de O. Probabilities. São Paulo: Editora Edgard Bücher Ltda

CF112 - PHYSICS IV

Syllabus: Geometric optics. Physical optics. Theory of relativity. Quantum mechanics. Conductivity in solids. Nuclear physics.

Bibliography

1. Halliday, David; Resnick, Robert; Walker, Jean. Fundamentals of Physics. Vol IV: Optics and Modern
2. Physics, 4th edition, LTC ? Livros Técnicos e Científicos ? Editora S. A, 1996. 2- Halliday, David; Resnick,
3. Robert; Krane, Kenneth S. Physics IV, 4th edition, LTC ? Livros Técnicos e Científicos ? Editora S. A, 1996.
4. Tipler, Paul, Physics for Scientists and Engineers Vol. IV ? Livros Técnicos e Científicos ? Editora S. A, 1995.

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1. Sears, Francis W., Zemansky, Mark W., Young, Hugh D., Physics, Electromagnetic Waves, Optics and Atomic Physics, 2nd edition, Pearson Addison Wesley, 1985. 2- Tipler, Paul, Physics -Modern Physics:
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CM313 - CALCULUS 3

Syllabus: Double and triple integrals. Fubini's and Change of Variables theorems. Vector calculus. Line integrals. Surface integrals. Green's, Gauss' and Stokes' theorems.

Bibliography

1. GUIDORIZZI, H. L. - A Course in Calculus, vol. 3, LTC, Rio de Janeiro.
2. STEWART, J. - Calculus, vol. 2, Cengage Learning, São Paulo, 2010.
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1. APOSTOL, T. M. - Calculus, vol. 2, 2ed., John Wiley, New York, 1969.
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6. EDWARDS, C. H. e PENNEY, D.E. - Calculus with Analytic Geometry, vol. 2, Prentice-Hall, São Paulo, 1997.

TE315 - DIFFERENTIAL EQUATIONS FOR ELECTRICAL ENGINEERING

Syllabus: Modeling of Systems by differential equations. Ordinary differential equations. Power series. Systems of first-order differential equations. Partial differential equations. Differential equations in electrical circuits and electromagnetism.

Bibliography



1. APOSTOL, T. M., Calculus, Barcelona : Reverte, c1988.
2. MUNEM, M. A.; FOULIS, D. J., Calculus, Rio de Janeiro : Guanabara Dois, 1982.
3. MAURER, W. A., Course of differential and integral calculus, São Paulo : E. Blucher, 1968-80.

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1. LEITHOLD, L. The calculus with analytic geometry. Vol. 2. São Paulo: Harbra, 1994.
2. BOULOS, P. Introduction to Calculus, Vol. II, Ed. Edgard Blucher, 1983.
3. FLEMMING, D. M. & GONÇALVES, M. B. Calculus B, Editora Makron-Books.
4. SPIVAK, M., Calculus, 4th edition.
5. SIMMONS, G. F. Calculus with Analytic Geometry Vol. 2 Editora McGraw-Hill.

TE318 - ELECTRIC CIRCUITS II

Syllabus: Sinusoidal excitation and phasors. Steady-state AC analysis, power in steady-state AC. Three-phase circuits. Laplace Transform Applied to Electric Circuits. Frequency response. Two-port networks. Transformers.

Bibliography

1. Fundamentals of Electric Circuits. Charles K. Alexander, Matthew N. O. Sadiku. Porto Alegre: Bookman, 2003.
2. Circuit Analysis in Engineering, Hayt, WH, Kemmerly, JE, Durbin, SM, 7th ed. McGrawHill, 2008.
3. Fundamentals of Electric Circuit Analysis. Johnson, Hiburn e Johnson. Rio de Janeiro: Prentice Hall do Brasil, 1994.

Complementary Bibliography

1. Introduction to Circuit Analysis. Robert L. Boylestad. Rio de Janeiro: Prentice-Hall, 1998.



2. Electric Circuits. James W. Nilsson, Susan A. Riedel. Rio de Janeiro: Livros Técnicos e Científicos, 2003.
3. Electric Circuits. Joseph A. Edminister. Rio de Janeiro: McGraw-Hill, 1972.
4. Electric Circuits. Luiz de Queiroz Orsini. São Paulo: E. Blucher. USP, 1971.
5. Electric Circuits. Yaro Burian Junior. Rio de Janeiro: Almeida Neves, c1977.

TE321 - ELECTRIC CIRCUITS LABORATORY II

Syllabus: Practical activities covering the following topics: Sinusoidal excitation and phasors. Steady-state AC analysis, power in steady-state AC. Three-phase circuits. Laplace Transform Applied to Electric Circuits. Frequency response. Passive filters. Two-port networks. Transformers.

Bibliography

1. Fundamentals of Electric Circuits. Charles K. Alexander, Matthew N. O. Sadiku. Porto Alegre: Bookman, 2003.
2. Circuit Analysis in Engineering, Hayt, WH, Kemmerly, JE, Durbin, SM, 7th ed., McGraw-Hill, 2008.
3. Fundamentals of Electric Circuit Analysis. Johnson, Hibern e Johnson. Rio de Janeiro: Prentice-Hall do Brasil, 1994.

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1. Introduction to Circuit Analysis, Robert L. Boylestad. Rio de Janeiro: Prentice-Hall, 1998.
2. Electric circuits. James W. Nilsson, Susan A. Riedel. Rio de Janeiro: Livros Técnicos e Científicos, 2003.
3. Electric circuits. Joseph A. Edminister. Rio de Janeiro: MacGraw-Hill, 1972.
4. Electric circuits. Luiz de Queiroz Orsini. São Paulo: E. Blucher; USP, 1971.
5. Electric circuits. Yaro Burian Junior. Rio de Janeiro: Almeida Neves, c1977.



TE322 - SIGNALS AND SYSTEMS

Syllabus: Signals and systems. Linear time-invariant systems. Fourier series. Fourier transform. Laplace transform. Z transform.

Bibliography

1. OPPENHEIM, Alan V.; WILLSKY, Alan S. Signals and systems. São Paulo: Pearson Prentice Hall, 2010.
2. LATHI, B. P. Linear signals and systems. Porto Alegre: Bookman, 2007.
3. HAYKIN, Simon S.; VAN VEEN, Barry. Signals and systems. Porto Alegre: Bookman, 2001.

Complementary Bibliography

1. HSU, Hwei P. Signals and systems. Porto Alegre: Bookman, 2012.
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3. KAMEN, Edward W.; HECK, Bonnie S. Fundamentals of signals and systems using MATLAB. Upper Saddle River: Prentice Hall, c1997.
4. NALON, José Alexandre. Introduction to digital signal processing. Rio de Janeiro: LTC, 2009.
5. INGLE, Vinay K.; PROAKIS, John G. Digital signal processing using MATLAB®. 3rd ed. Stamford: Cengage Learning, c2012.

TH063 - TRANSPORT PHENOMENA IN ENGINEERING

Syllabus: Introduction to transport phenomena: concepts and definitions, migration along gradients, physical properties of matter, conservation laws. Heat transport: conduction, convection, and thermal radiation. Problem analysis: thermal study of electrical cable heating, heat sinks. Transient and steady-state heat conduction. Mass transfer by diffusion. Convection: fluid dynamic, thermal, and concentration boundary layers. Convection transfer equations:



conservation of mass, linear momentum, energy, and partial mass. Internal and external flows: heat exchangers.

Bibliography

1. Beek, W.J., Mutzall, K.M.K. Transport Phenomena. John Wiley, 1975.
2. Bird, R.B., Stewart, W.E., Lightfoot, E.N. Transport Phenomena. LTC Editora, 2004.
3. Cengel, Y.A., Ghajar, A.J. Heat and Mass Transfer. AMGH, 2012.
4. Incropera, F.P., Dewitt, D.P. Fundamentals of Heat and Mass Transfer. LTC Editora, Fifth edition, 2003.
5. Kreith, F., Bohn, M.S. Principles of Heat Transfer. Thomson, 2003.
6. Sisson, L.E., Pitts, D.R. Transport Phenomena. LTC Editora, 2001.

Complementary Bibliography

1. Atkins, P.W. Physical Chemistry, LTC, 1999.
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3. Baehr, H.D., Stephan, K. Heat and Mass Transfer. Springer, 2006.
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9. Kagan, N., Oliveira, C.C.B., Robba, E.J. Introduction to Electrical Power Distribution Systems. Blücher, 2010.
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11. Kotake, S., Hijikata, K. Numerical Simulations of Heat Transfer and Fluid Flow on a Personal Computer. Elsevier, 1993.



12. Lai, W.M., Rubin, D., Krempf, E. Introduction to Continuum Mechanics. Pergamon Press, 1993.
13. Mase, G.T., Smelser, R.E., Mase, G.E. Continuum Mechanics for Engineers, CRC Press, 2010.
14. Massoud, M. Engineering Thermofluids. Springer, 2005.
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16. Özisik, M.N. Heat Transfer. Guanabara Koogan, 1990.
17. Schmidt, F.W., Henderson, R.E., Wolgemuth, C.H. Introduction to Thermal Sciences. Bilcher, 1996.

5TH PERIOD

TE328 - MICROPROCESSORS AND MICROCONTROLLERS

Syllabus: History of microprocessors and microcontrollers. Microcomputer structures: microprocessor, memory, input and output. Microprocessor architecture: registers, indexers, stacks, addressing. Parallel and serial interfaces. A/D and D/A converters. Memories. Data transfer instructions, logical and arithmetic operations, branches and subroutines. Interrupts. Assembly language programming. Design of microprocessed systems. Programmable counter. Interrupt controller. DMA controller. Typical applications of microcontrollers.

Bibliography

1. Tanenbaum, Andrew S., Austin, Todd., Structured Computer Organization, Pearson Prentice Hall, 2013
2. Tocci, Ronald J; Wiedmer, Neal S; Moss, Gregory L. Digital Systems - Principles and Applications; Pearson Pereira, Fábio., Microcontrollers MSP430: theory and practice, São Paulo: Erica, 2005



Complementary Bibliography

1. Stallings, William., Computer Architecture and Organization, São Paulo:Pearson Prentice Hall, 2010.
2. Furber, Steve., ARM system-on-chip architecture, England: Addison-Wesley, 2000.
3. Pedroni, Volnei A. Modern Digital Electronics and VHDL. Editora Campus 2010.
4. Davies, John H. MSP430 Microcontroller Basics. Editora Elsevier 2008.
5. Stokes, Jon., Inside the machine : an illustrated introduction to microprocessors and computer architecture, No Starch Press, c2007.

TE329 - ANALOG ELECTRONICS II

Syllabus: Frequency response of amplifiers. Operational amplifiers: frequency response, non-linearities, non-idealities. Feedback. Differential amplifiers, oscillators. Power amplifiers. Multi-stage amplifiers. Active filters.

Bibliography

1. RAZAVI, Behzad. Fundamentals of microelectronics. Rio de Janeiro: LTC, 2010. 728p., il. Includes references and index. ISBN 9788521617327 (broch.).
2. SEDRA, Adel S; SMITH, Kenneth C. Microelectronics. 5. ed. São Paulo: Pearson / Prentice Hall, c2007. xiv, 848 p., il. Includes bibliography and index. ISBN 9788576050223 (broch.).
3. BOYLESTAD, Robert L.; NASHELSKY, Louis. Electronic devices and circuit theory. 8. ed. São Paulo: Pearson Education do Brasil, c2004. xviii, 672p., il., tabs. Appendix. ISBN 8587918222 (Broch.).

Complementary Bibliography

1. Richard C. Jaeger, Travis N. Blalock, Microelectronic circuit design — 4th ed. McGraw-Hill, 2011



2. HORENSTEIN, Mark N. Microelectronics circuits & devices. Rio de Janeiro: Prentice-Hall do Brasil, 1996. xv, 689 p., il. Includes bibliography and index. ISBN 8570540485 (broch.).
3. MILLMAN, Jacob; GRABEL, Arvin. Microelectronics. 2. ed. Lisboa: McGraw-Hill, 1991-1992. 2v. (1134 p.), il. Includes bibliography and appendices.
4. LUDWIG, Reinhold; BRETCHKO, Pavel. RF circuit design: theory and applications. Upper Saddle River,
5. NJ: Prentice-Hall, c2000. xiv, 642 p., il, + CD-ROM. Includes bibliographic references and index. ISBN 0130953237 (enc.).
6. GRAY, Paul R.; MEYER, Robert G. Analysis and design of analog integrated circuits. 3rd. ed. New York: J. Wiley, c1993. 792p., il. ISBN 0471574953 (enc.).

TE331 - ELECTRONIC INSTRUMENTATION

Syllabus: General concepts of electronic instrumentation, physical and electrical quantities, sensors and transducers, signal conditioning circuits, amplifiers and filters, digital/analog converters, analog/digital converters, data processing and analysis, notions of accuracy, precision and resolution, notions of standard, verification and calibration, error treatment in measurements, noise reduction techniques, bench instruments, digital interfacing, serial interfaces, wireless interfaces.

Bibliography

1. A. Balbinot, V. Brusamarello, Instrumentation and Fundamentals of Measurements, v.1, LTC, 2006.
2. HELFRICK, Albert D; COOPER, William David. Modern electronic instrumentation and measurement techniques. Rio de Janeiro: Prentice-Hall do Brasil, c1994. 324 p.
3. BOYLESTAD, Robert L.; NASHELSKY, Louis. Electronic devices and circuit theory. 8. ed. São Paulo: Pearson Education do Brasil, c2004. xviii, 672p.

Complementary Bibliography

1. A. Helfrick, W. Cooper, Electronic Instrumentation, PHB, 1990



2. J. Alloca, A. Stuart, Transducers-Theory & Applications, Prentice-Hall, 1984
3. J.J. Car, Elements of Electronic Instrumentation and Measurement, 2ed, Pentrice Hall, 1986.
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5. Fundamentals of Electric Circuit Analysis. Johnson, Hibern e Johnson. Rio de Janeiro: Prentice-Hall do Brasil, 1994

TE332 - ANALOG ELECTRONICS LABORATORY II

Syllabus: Practical activities covering the following topics. Frequency response of amplifiers. Operational amplifiers: frequency response, non-linearities, non-idealities. Feedback. Differential amplifiers, oscillators. Power amplifiers. Multi-stage amplifiers. Active filters.

Bibliography

1. RAZAVI, Behzad. Fundamentals of microelectronics. Rio de Janeiro: LTC, 2010. 728p., ii. Includes references and index. ISBN 9788521617327 (broch.).
2. SEDRA, Adel S; SMITH, Kenneth C. Microelectronics. 5. ed. São Paulo: Pearson / Prentice Hall, c2007. xiv, 848 p., ii. Includes bibliography and index. ISBN 9788576050223 (broch.).
3. BOYLESTAD, Robert L.; NASHELSKY, Louis. Electronic devices and circuit theory. 8. ed. São Paulo: Pearson Education do Brasil, c2004. xviii, 672p., ii., tabs. Appendix. ISBN 8587918222 (Broch.).

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1. Richard C. Jaeger, Travis N. Blalock, Microelectronic circuit design — 4th ed. McGraw-Hill, 2011
2. HORENSTEIN, Mark N. Microelectronics circuits & devices. Rio de Janeiro: Prentice-Hall do Brasil, 1996. xv, 689 p., ii. Includes bibliography and index. ISBN 8570540485 (broch.).



3. MILLMAN, Jacob; GRABEL, Arvin. Microelectronics. 2. ed. Lisboa: McGraw-Hill, 1991-1992. 2v. (1134 p.), ii. Includes bibliography and appendices.
4. LUDWIG, Reinhold; BRETCHKO, Pavel. RF circuit design: theory and applications. Upper Saddle River, NJ: Prentice-Hall, c2000. xiv, 642 p., ii, + CD-ROM. Includes bibliographic references and index. ISBN 0130953237 (enc.).
5. GRAY, Paul R.; MEYER, Robert G. Analysis and design of analog integrated circuits. 3rd. ed. New York: J. Wiley, c1993. 792p., ii. ISBN 0471574953 (enc.).

TE333 - INSTRUMENTATION AND CONTROL LABORATORY

Syllabus: Practical activities covering the following topics: Signal conditioning circuits for sensors, basic control and instrumentation circuits, D/A and A/D converters, PWM modulation, P, PI, PD, and PID controllers, DC motor control, control of systems with disturbances, lead and lag phase compensation.

Bibliography

1. OGATA, Katsuhiko. Modern Control Engineering. São Paulo: LTC, c2010, 5ed. ISBN: 978-85-7605-810-6 (paperback)
2. NISE, Norman S. Control Systems Engineering. Rio de Janeiro: LTC, c2012. xvi, 745p. ISBN: 9788521621355
3. BOLTON, William. Control Engineering. São Paulo: Makron, 1995. ISBN: 853460343X (paperback)

Complementary Bibliography

1. MONTEIRO, Luiz Henrique Alves. Dynamic Systems. São Paulo: Livraria da Física, 2011, 3ed. ISBN: 9788578611026 (paperback)
2. GEROMEL, José Claudio e KOROGUI, Rubens H. Linear Control of Dynamic Systems. São Paulo, SP: Blucher: Academia Brasileira de Ciências, 2011. ISBN: 9788521205906.



3. PALM, William John. Control Systems Engineering. New York: John Wiley, c1986. ISBN: 047181086X (hardcover)
4. ANTSAKLIS, Panos J. e MICHEL, Anthony N. Linear Systems. Boston, MA: Birkhäuser Boston, 2006.
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TE334 - LINEAR CONTROL SYSTEMS

Syllabus: Introduction to feedback control systems, dynamics of linear time-invariant systems, transient response, Routh criterion, performance specifications, system types, PID controller design, root locus, lead/lag compensator design, frequency domain analysis, phase and gain margins.

Bibliography

1. OGATA, Katsuhiko. Modern Control Engineering. São Paulo: LTC, c2010, 5ed. ISBN: 978-85-7605-810-6 (paperback)
2. NISE, Norman S. Control Systems Engineering. Rio de Janeiro: LTC, c2012. xvi, 745p. ISBN: 9788521621355
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3. PALM, William John. Control Systems Engineering. New York: John Wiley, c1986. ISBN: 047181086X (hardcover)
4. ANTSAKLIS, Panos J. e MICHEL, Anthony N. Linear Systems. Boston, MA: Birkhäuser Boston, 2006.
5. KHALIL, Hassan K. Nonlinear Systems. Upper Saddle River, N.J.: Prentice Hall, c1996. 2ed.

TE369 - ELECTRICITY AND MAGNETISM

Syllabus: Electric charge. Electric field. Coulomb's Law. Capacitance, resistance, Ohm's law. Gauss's Law. Electrostatic potential. Magnetic field. Laplace's equation. Biot-Savart law, Ampère's law, Gauss's law for magnetism. Self-inductance, mutual inductance. Maxwell's equations in integral and local forms and the constitutive equations of electromagnetism. Solving electrostatic and magnetostatic problems using rectangular, cylindrical, and spherical coordinate systems and applying vector calculus tools.

Bibliography

1. HAYT, William Hart. Electromagnetism. 3rd ed. or higher. // HAYT, William Hart. Electromagnetism. 7th ed. Porto Alegre: AMGH, 2010. 574p., il., graphs, tabs. Includes references and index. ISBN 9788586804656 (paperback). // HAYT, William Hart; BUCK, John A. Ele
2. SADIKU, Matthew N. O. Elements of Electromagnetism. 3rd ed. or higher. // SADIKU, Matthew N. O. Elements of Electromagnetism. 5th ed. Porto Alegre, RS: Bookman, 2012. 702 p., il., graphs, tabs. ISBN 9788540701502. // SADIKU, Matthew N. O. Elements of e
3. HALLIDAY, David et alii. Fundamentals of Physics. 4th ed. or higher. v.3. // HALLIDAY, David. Fundamentals of Physics. 9th ed. Rio de Janeiro: LTC, c2012. v.3, il. Includes bibliography and index. ISBN 9788521619031 (paperback). // HALLIDAY, David. Fundamentals of fis



Complementary Bibliography

1. EDMINISTER, Joseph A. Electromagnetism. São Paulo: McGraw-Hill do Brasil, 1980. 232p., il. (Schaum's Collection). Includes appendix and index.
2. CHAVES, Alaor Silvério. Physics: Basic Course for Physical Sciences and Engineering Students. Rio de Janeiro: Reichmann & Affonso, 2001. v.2, il. ISBN 8587148508 (paperback).
3. MACHADO, Kleber Daum. Electromagnetism Theory. 2nd ed. Ponta Grossa, PR: Ed. UEPG, 2004. v.1. Includes bibliographic references and index. ISBN 8586941077 (hardcover).
4. NUSSENZVEIG, H. M. (Herch Moyses). Basic Physics Course. São Paulo: E. Blucher, 1997-. v.3, il. Includes bibliography and index. ISBN (Paperback).
5. MACEDO, Annita. Electromagnetism. Rio de Janeiro: Ed. Guanabara, c1988. 638p., il., 21 cm. Bibliography: p. 630-631. ISBN 8527701006 (paperback).

TE374 - EXTENSION PROJECT D

Syllabus: Supervised participation in extension activities related to the Electrical Engineering course and linked to extension programs, extension projects, or institutional programs that have their own regulations and evaluation committees and comply with extension principles.

Bibliography

1. SOUSA, A. L. – A História da Extensão Universitária, Editora Alínea, 2010;
2. TAVARES, C.A.R.; FREITAS, K.S. - Extensão Universitária: O Patinho Feio da Academia?, 1º edição. Paco Editorial, 2016;
3. FÓRUM DE PRÓ-REITORES DE EXTENSÃO DAS UNIVERSIDADES PÚBLICAS BRASILEIRAS. Plano Nacional de Extensão Universitária. Ilhéus; Editus, 2001. 65p. (Coleção Extensão Universitária; v. 1);
4. GONÇALVES, H.A. - Manual de Projetos de Extensão universitária, Editora Avercamp, 2008.



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1. SIVERES, L. - A Extensão Universitária como Principio de Aprendizagem, Liber Livro, 2013;
2. DE SOUZA, D. T.; MORENO, A.; NEVES, C.A.N.; VIEIRA, L.B. – Práticas e Reflexões na Extensão universitária, Editora UFV, 2017;
3. SOUSA, A. I. P.; FELIPE, R.M.S.; STRANIERI, R.E.; SOUZA, I.P.; FACUNDO, V. e dos SANTOS, R. Extensão: a universidade plugada na comunidade, 1a ed., Editora Itacaidinas, 2018;
4. GUÉRIOS, E.; STOLTZ, T. - Educação e Extensão Universitária - Pesquisa e Docência, 1a ed., Juruá, 2017;
5. SANTOS, B.S. Universidade do Século XXI: para uma reforma democrática e emancipatória da Universidade São Paulo: Cortez 2004. 120p. (Coleção questões da nossa época; v. 120).

6TH PERIOD

TE323 - ENERGY CONVERSION I

Syllabus: Magnetic circuits, transformers, principles of electromechanical energy conversion, DC machines, stepper motors, and servomotors.

Bibliography

1. FITZGERALD, A. E., KINGSLEY Jr. C. E UMANS, S. D. Electric Machinery: with Introduction to Power Electronics. 6th Edition, Bookman, 2006.
2. TORO, V. Del, MARTINS, O. A. Fundamentals of Electric Machines. LTC, 1999.
3. CHAPMAN, S. J. Fundamentals of Electric Machines. 5th Edition, AMGH Editora LTDA, 2013.

Complementary Bibliography



1. Oliveira, José Carlos de. Transformers: Theory and Tests. Editora Edgard Blucher, 1984.
2. KOSOW, I. Electric Machines and Transformers. Editora Globo. 1986.
3. Bim, Edson. Electric Machines and Drives. Editora Elsevier, 2009.
4. Falcone, A. G, Electromechanics I. Editora Blucher, 1979.
5. Falcone, A. G, Electromechanics II. Editora Blucher, 1979.

TE325 - ENERGY CONVERSION LABORATORY

Syllabus: Practical activities covering the following topics: Magnetic circuits. Transformer. Electromechanical energy conversion. Direct current machines. Special machines.

Bibliography

1. Bose, B.K. Modern Power Electronics and AC Drives- Prentice Hall, 2002
2. Rashid, M. H. Power Electronics: Devices, Circuits, and Applications. 4th ed. São Paulo: Pearson, 2014. 853.
3. Bim, E. Electric Machines and Drives. An Introduction. Editora Elsevier, São Paulo 2009

Complementary Bibliography

1. Krishnan, Electric Motor Drives: Modeling, Analysis, and Control, Prentice-Hall, Inc., 2001
2. STEPHAN, R. M. – Drive, Command and Control of Electric Machines, Ed. Ciência Moderna, 2013.
3. LEONHARD, W.; Control of Electrical Drives; Springer-Verlag, 1985, 341p.
4. PETRUZELLA, Frank D. Electric Motors and Drives. São Paulo: Bookman, 2013.
5. Mohan, Ned. Electric Machines and Drives: Introductory Course-Ed 01/205 LTC Atlas São Paulo.



TE338 - ELECTROMAGNETIC WAVES

Syllabus: Electromagnetic field. Maxwell's equations. Uniform plane wave. Waveguides. Electromagnetic dipole. Electromagnetic potentials. Antennas.

Bibliography

1. SADIKU, Matthew N. O. Elements of Electromagnetism. Bookman, Porto Alegre, 3rd ed. or higher.
2. HAYT, William Hart. Electromagnetism, 4th Edition or higher, Rio de Janeiro, Editora LTC
3. GRIFFITHS, David J. (David Jeffery). Electrodynamics. 3rd ed. São Paulo: Pearson, 2011. xv, 402 p., il. ISBN 9788576058861 (paperback).

Complementary Bibliography

1. JACKSON, John David. Classical Electrodynamics. 2nd ed. or higher, New York: J. Wiley
2. Sophocles J. Orfanidis, Electromagnetic Waves and Antennas, freely available at www.ece.rutgers.edu/~orfanidi/ewa.
3. REITZ, John R; MILFORD, Frederick J; CHRISTY, Robert W. Fundamentals of Electromagnetic Theory. 3rd ed. Rio de Janeiro: Campus, c1982. 516p., il. Includes bibliographic references. ISBN 8570011032.
4. EDMINISTER, Joseph A. Electromagnetism. São Paulo: McGraw-Hill do Brasil, 1980. 232p., il. (Schaum's Collection).
5. RIBEIRO, José Antônio Justino. Propagation of Electromagnetic Waves: Principles and Applications. São Paulo: Erica, 2004. 390 p., il. Includes bibliography and index. ISBN 857194993X (paperback).

TE339 - POWER SYSTEMS I



Syllabus: Structure of the Power System. Characteristics of the Brazilian Electric System. Equivalent Models of Power System Components. Per Unit Systems. Linearized Power Flow. Generation Dispatch. Environmental aspects.

Bibliography

1. MONTICELLI, Alcir José; GARCIA, Ariovaldo. Introduction to Electric Power Systems. Campinas, SP: Unicamp, 2003. viii, 251 p., il. (Textbook). ISBN 8526806629 (paperback).
2. ELGERD, Olle Ingemar. Introduction to Electric Power Systems Theory. São Paulo: McGraw-Hill do Brasil, 1976. xviii, 604 p., il. Appendices: p. [577]-597. A. Elements of Vector and Matrix Algebra - B. Computer Program for Solving the EEFC.
3. STEVENSON, William D. Elements of Power System Analysis. 2nd ed. São Paulo: McGraw-Hill, c1986. 458p., il. Includes appendix and index.

Complementary Bibliography

1. RAMOS, Dorel Soares; DIAS, Eduardo Mario. Electric Power Systems: Steady State. Rio de Janeiro: Guanabara Dois, 1982- . nv., il., 23 cm.
2. GLOVER, J. Duncan; SARMA, Mulukutla S. Power System Analysis and Design. 3rd ed. Pacific Grove: Brooks/Cole, 2002. 656p., il. ISBN 0534953670 (hardcover).
3. KOTHARI, D. P; NAGRATH, I. J. Modern Power System Analysis. Boston: McGraw-Hill Higher Education, c2008. xiv, 694 p., il., 23 cm. (McGraw-Hill Core Concepts in Electrical Engineering Series). ISBN 0073404551.
4. MOMOH, James A. Electric Power System Applications of Optimization. New York: Marcel Dekker, 2001. xiv, 478p., il. (Power Engineering, 11). Includes bibliography and index. ISBN 0824791053 (hardcover).
5. ZANETTA JR., Luiz Cera. Fundamentals of Electric Power Systems. São Paulo: Livraria da Física, 2006. 312 p., il. Bibliography: p.312. ISBN 8588325411 (paperback).



Syllabus: Study of clipped sinusoidal waveforms and other periodic waveforms, power semiconductors, uncontrolled rectifiers, semi and fully controlled rectifiers, basic topologies of non-isolated DC-DC converters, inverters for AC motor drives, phase-shift control of inverters, PWM modulation control of inverters, AC voltage controllers, power switch drive circuits, electrical protection of converters, thermal sizing.

Bibliography

1. Rashid, M. H. Power Electronics: Devices, Circuits, and Applications. 4th ed. São Paulo: Pearson, 2014. 853.
2. HART, D. W. Power Electronics - Circuit Analysis and Design. AMGH Editora LTDA, 2013.
3. Mohan, Ned. Power Electronics: Introductory Course-Ed 1/2014 LTC Atlas São Paulo

Complementary Bibliography

1. Ahmed, A. Power Electronics - Ed. Prentice Hall, São Paulo, 2000
2. Barbi, I. Power Electronics - Author's Edition, Florianópolis, 2000
3. ERICKSON, R. W.; Fundamentals of Power Electronics, 2nd edition, Kluwer Academic Publishers, 2001.
4. ARRABAÇA, Devair Aparecido; GIMENEZ, Salvador Pinillos; Power Electronics: Energy Converters (AC/DC); 1st edition; São Paulo: Érica, 2011.
5. BOSE, K. Power Electronics and Motor Drives – Advances and Trends. 1st. ed. Burlington: Elsevier, 2006.

TE342 - FUNDAMENTALS OF COMMUNICATION

Syllabus: Representation of signals and systems in the time and frequency domains. Random signals in continuous time. Amplitude modulation. Angle modulation. Analog signal coding. Digital transmission in baseband. Introduction to digital modulation systems.

Bibliography



1. HAYKIN, Simon S. Communication Systems. 5th ed. Porto Alegre, RS: Bookman, 2011. 512 p., il., graphs. Includes references and index. ISBN 9788577807253.
2. HAYKIN, Simon S. Communication Systems: Analog and Digital. 4th ed. Porto Alegre: Bookman, 2004. xi, 837 p., il. Includes index. ISBN 8573079363 (hardcover).
3. Bernard Sklar, Digital Communications, 2nd Edition, Prentice Hall 2004.

Complementary Bibliography

1. ALENCAR, Marcelo S; ROCHA, Valdemar C. Communication Systems. Boston, MA: Springer Science+Business Media, Inc., 2005. v.: digital. (Engineering (Springer-11647; ZDB-2-ENG)). Available at: <http://dx.doi.org/10.1007/b138483>. Accessed on: 17 Apr. 2017.
2. Leon W. Couch, Digital and Analog Communication Systems, 7th Edition, Prentice Hall, 2007
3. LATHI, B. P. (Bhagwandas Pannalal). Communication Systems. Rio de Janeiro: Guanabara Dois, 1979. 401p., il. Includes bibliography and index.
4. RAPPAPORT, Theodore S. Wireless Communications: Principles and Practice. 2nd ed. São Paulo: Pearson Prentice Hall, 2009. 409p., il. Includes references and index. ISBN 9788576051985 (paperback).
5. CARLSON, A. Bruce. Communication Systems: An Introduction to Signals and Noise in Electrical Communication. [S.I.]: USP: McGraw-Hill, 1981. xiii, 487p., il., 25 cm. Bibliography: p. [475]-479.

TE344 - RESIDENTIAL AND INDUSTRIAL ELECTRICAL INSTALLATIONS I

Syllabus: Residential and Industrial Electrical Installations. Energy Efficiency. Standardization. Environmental aspects.

Bibliography

1. CREDER, H. Electrical Installations. 15th Ed., LTC, Rio de Janeiro, RJ, 2007



2. MAMEDE FILHO, J. Industrial Electrical Installations, 7th ed., Rio de Janeiro: LTC, 2007. ISBN: 8521615205.
3. NISKIER, J; MACINTYRE, AJ. Electrical Installations. 5th ed., Rio de Janeiro: LTC, c2008., 2008. ISBN: 9788521615897.

Complementary Bibliography

1. Cotrim, Ademaro A. M. B., Electrical Installations, 5th ed. rev., São Paulo: Pearson Prentice Hall, c2009. 2009. ISBN: 9788576052081
2. ABNT NBR 5410 - Low Voltage Electrical Installations, 2008.
3. Fundamentals of Electric Circuits. Charles K. Alexander, Matthew N. O. Sadiku. Porto Alegre: Bookman, 2003.
4. Circuit Analysis in Engineering, Hayt, WH, Kemmerly, JE, Durbin, SM, 7th ed., McGrawHill, 2008.
5. Fundamentals of Electric Circuit Analysis. Johnson, Hiburn e Johnson. Rio de Janeiro: Prentice-Hall do Brasil, 1994.

TE366 - UNIVERSAL DESIGN FOR ELECTRICAL ENGINEERING

Syllabus: Concept and principles of universal design. Human diversity. Accessibility concepts. Applications of universal design in electrical engineering.

Bibliography

1. ORNSTEIN, Sheila; ALMEIDA PRADO, Adriana; LOPES, Maria Elisabete (Orgs.). Universal Design: Paths to Accessibility in Brazil. – São Paulo: Annablume, 2010.
2. ULBRICHT, Vania Ribas, FADEL, Luciane, BATISTA, Claudia Regina. Design for Accessibility and Inclusion [e-book]. São Paulo: Blucher, 2017.
3. LIDWELL, William. Universal Principles of Design / William Lidwell, Kritina Holden, Jill Butler; translation: Francisco Araújo da Costa; technical review: Maria Helena Werneck Bomeny. – Porto Alegre: Bookman, 2010



Complementary Bibliography

1. STEINFELD, Edward; MAISEL, Jordana L. Universal Design: Creating Inclusive Environments. New Jersey: John Wiley & Sons, 2012
2. CAMBIAGHI, Silvana. Universal Design: Methods and Techniques for Architects and Urban Planners. 3rd ed. rev. São Paulo: Editora Senac São Paulo, 2012.
3. GOMES, Daniela; QUARESMA, Manuela. Introduction to Inclusive Design. Editora Appris, 2018.
4. LOWDERMILK, Travis. User-Centered Design. Editora Novatec, 2013.
5. CARVALHO E CASTRO, Jary. Coming and Going - Accessibility, Everyone's Commitment. Gráfica Gibim e Editora, 2013.

7TH PERIOD

TE335 - OCCUPATIONAL SAFETY ENGINEERING

Syllabus: Introduction to Occupational Safety Engineering - evolution. Concept of occupational safety and other fundamental concepts. Workplace accident risks, risk mapping. Causes and consequences of workplace accidents. Regulatory standards of the CLT related to safety and occupational medicine. Collective protection measures, machine protection, electric shock risk. Personal and collective protective equipment, PPE and CPC. Fire protection and combat. Unhealthy and hazardous activities. Civil and criminal liability for workplace accidents. Basics of first aid in workplace accidents.

Bibliography

1. BRASIL. Occupational Safety and Medicine. 49th ed. São Paulo: [s.n.], Atlas, 2001. 690p., il. (Atlas Legislation Manuals). Includes index. ISBN 8522429731.
2. BENSOUSSAN, Eddy; ALBIERI, Sergio. Manual of Hygiene, Safety, and Occupational Medicine. São Paulo; Rio de Janeiro: Atheneu, c1997. 206p., il. ISBN 8573790148 (paperback).



3. GONÇALVES, Edward Abreu. Manual of Occupational Safety and Health. 3rd ed. São Paulo: LTr, 2006. 1456 p., il. Bibliography: p. [1453]-1456. ISBN 8536108134 (paperback).
4. **Complementary Bibliography**
5. RACHADEL, Jayme Passos; Catal, Rodrigo. Model of Safety and Health Management System in Electrical Services at Construction Sites. 2013. 125f. Dissertation (master's) - Federal Technological University of Paraná, Graduate Program
6. Oliveira, Aloixio Monteiro. Basic Course on Electrical Safety. 2007. Author's Edition
7. Pereira, Joaquim Gomes; Souza, João José Barrico. Manual for Interpretation and Application of NR-10. NR10 Commented. 2010. Regional Superintendence of Labor and Employment. São Paulo/SP.
8. Couto, Araujo Hudson. Ergonomics Applied to Work. Belo Horizonte: Ergo Editora, Volumes 1 and 2, 1995.
9. Dilemnando Brito Filho. Human and General Toxicology, 2nd edition. Rio de Janeiro, 1988, Edições Atheneu.

TE340 - ENERGY CONVERSION II

Syllabus: Introduction to rotating machines: rotating field and principle of operation of AC machines. Synchronous machines: equivalent circuit and capability chart. Introduction to Asynchronous Machines (induction motor).

Bibliography

1. FITZGERALD, A. E., KINGSLEY Jr. C. E UMANS, S. D. Electric Machinery: with Introduction to Power Electronics. 6th Edition, Bookman, 2006.
2. TORO, V. Del, MARTINS, O. A. Fundamentals of Electric Machines. LTC, 1999.
3. CHAPMAN, S. J. Fundamentals of Electric Machines. 5th Edition, AMGH Editora LTDA, 2013.



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1. KOSOW, I. Electric Machines and Transformers. Editora Globo. 1986.
2. JORDÃO, R. G. Synchronous Machines. 2nd Edition, LTC Editora, 2013.
3. Bim, Edson. Electric Machines and Drives. Editora Elsevier, 2009.
4. MOHAN, NED. Electric Machines and Drives – Introductory Course. Editora LTC, 2015.
5. Falcone, A. G, Electromechanics II. Editora Blucher, 1979.

TE359 - POWER ELECTRONICS II

Syllabus: Rectifiers with high power factor, isolated DC-DC converters (switched-mode power supplies), grid-tie inverters, active filters, converters for DC power transmission.

Bibliography

1. HART, D. W. Power Electronics - Circuit Analysis and Design. AMGH Editora LTDA, 2013.
2. MOHAN, N. Power Electronics – Introductory Course. Editora LTC, 2014.
3. Rashid, M. H. Power Electronics: Devices, Circuits, and Applications. 4th Edition. Ed. Pearson, São Paulo, 2014.

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1. Ahmed, A. Power Electronics. Ed. Pearson, São Paulo, 2000.
2. Barbi, I. Power Electronics. 7th Edition. Author's Edition, Florianópolis.
3. Mello, L. F. P. Switched-Mode Power Supply Design - Theory and Practice, Ed. Érica, 2011.
4. Barbi, I. Switched-Mode Power Supply Design. 3rd Edition. Author's Edition, Florianópolis. Arrabaca, D. A., Gimenez, S. P. Power Electronics - AC/DC Energy Converters. Ed. Érica, São Paulo, 2011.



TE360 - RESIDENTIAL AND INDUSTRIAL ELECTRICAL INSTALLATIONS II

Syllabus: Planning criteria for industrial electrical installations. Arrangements adopted in industrial power distribution. Voltage level selection - criteria. Voltage regulation, standards, and calculation methods. Electric motor starting: starting methods, effects and standards, calculation of voltage drops during starting. Reactive power compensation in industrial installations.

Bibliography

1. CREDER, H. Electrical Installations. 15th Ed., LTC, Rio de Janeiro, RJ, 2007
2. MAMEDE FILHO, J. Industrial Electrical Installations, 7th ed., Rio de Janeiro: LTC, 2007. ISBN: 8521615205.
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1. Cotrim, Ademaro A. M. B., Electrical Installations, 5th ed. rev., São Paulo: Pearson Prentice Hall, c2009. 2009. ISBN: 9788576052081
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5. Fundamentals of Electric Circuit Analysis. Johnson, Hiburn e Johnson. Rio de Janeiro: Prentice-Hall do Brasil, 1994.

TE361 - POWER SYSTEMS II



Syllabus: Introduction to power system operation. Methods for calculating power flow in transmission and distribution systems. Economic dispatch. Introduction to Optimal Power Flow. Real-time operation. Environmental aspects.

Bibliography

1. MONTICELLI, Alcir Jose. Power Flow in Electric Power Networks. São Paulo; Rio de Janeiro: E. Blucher: Electric Power Research Center, 1983. 164 p., il., 23 cm. Bibliography: p. [163]- 164.
2. MILLER, Robert H. Operation of Power Systems. São Paulo: McGraw-Hill, 1987. 192 p.
3. VIEIRA FILHO, Xisto. Operation of Power Systems with Automatic Generation Control. Rio de Janeiro: Campus: ELETROBRAS, 1984. 410 p., il., 23 cm. Bibliography: p. 405-410. ISBN 857001144X (paperback).

Complementary Bibliography

1. Wood, A.J. e Wollenberg, B.F. – "Power Generation, Operation, and Control"- John Wiley and Sons, INC., 2nd Ed., 1996
2. STEVENSON, William D. Elements of Power System Analysis. 2nd ed. São Paulo: McGraw-Hill, c1986. 458p., il. Includes appendix and index.
3. MONTICELLI, Alcir José; GARCIA, Arioaldo. Introduction to Electric Power Systems. Campinas, SP: Unicamp, 2003. viii, 251 p., il. (Textbook). ISBN 8526806629 (paperback).
4. GLOVER, J. Duncan; SARMA, Mulukutla S. Power System Analysis and Design. 3rd ed. Pacific Grove: Brooks/Cole, 2002. 656p., il. ISBN 0534953670 (hardcover).
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Syllabus: Supervised participation in extension activities related to the Electrical Engineering course and linked to extension programs, extension projects, or institutional programs that have their own regulations and evaluation committees and comply with extension principles.

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1. SOUSA, A. L. – A História da Extensão Universitária, Editora Alínea, 2010;
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3. FÓRUM DE PRÓ-REITORES DE EXTENSÃO DAS UNIVERSIDADES PÚBLICAS BRASILEIRAS. Plano Nacional de Extensão Universitária. Ilhéus; Editus, 2001. 65p. (Coleção Extensão Universitária; v. 1);
4. GONÇALVES, H.A. - Manual de Projetos de Extensão universitária, Editora Avercamp, 2008.

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1. SIVERES, L. - A Extensão Universitária como Principio de Aprendizagem, Liber Livro, 2013;
2. DE SOUZA, D. T.; MORENO, A.; NEVES, C.A.N.; VIEIRA, L.B. – Práticas e Reflexões na Extensão universitária, Editora UFV, 2017;
3. SOUSA, A. I. P.; FELIPE, R.M.S.; STRANIERI, R.E.; SOUZA, I.P.; FACUNDO, V. e dos SANTOS, R. Extensão: a universidade plugada na comunidade, 1a ed., Editora Itacaúnas, 2018;
4. GUÉRIOS, E.; STOLTZ, T. - Educação e Extensão Universitária - Pesquisa e Docência, 1a ed., Juruá, 2017;
5. SANTOS, B.S. Universidade do Século XXI: para uma reforma democrática e emancipatória da Universidade. São Paulo: Cortez, 2004. 120p. (Coleção questões da nossa época; v. 120).



TE351 - MICROELECTRONICS I

Syllabus: Conceptualization of circuit integration. Impact of VLSI technology use. Economic considerations and device acquisition time. Programmable devices: PLD, PAL, FPGA. Design Methodology. Hardware description languages. C++ integration with HDL. Complete programming of a device.

Bibliography

1. PEDRONI, Volnei A. Modern digital electronics and VHDL. Rio de Janeiro: Elsevier, c2010. 619 p., ill. Includes bibliography and index. ISBN 9788535234657 (paperback).
2. PEDRONI, Volnei A. Circuit design and simulation with VHDL. 2nd ed. Cambridge, MA: The MIT Press, 2010. xix, 608 p. ISBN 9780262014335 (hardcover).
3. TOCCI, Ronald J. Digital systems: principles and applications. 11th ed. São Paulo: Pearson, c2011. xx, 817 p., ill. ISBN 9788576059226 (paperback).

Complementary Bibliography

1. ASHENDEN, Peter J. Digital design: an embedded systems approach using VHDL. Amsterdam: Elsevier/Morgan Kaufmann Pub., c2008. xx, 573 p., ill. Includes bibliography and index. ISBN 9780123695284 (paperback).
2. D'AMORE, Roberto. VHDL: description and synthesis of digital circuits. Rio de Janeiro: Livros Tecnicos e Científicos, c2005. xiii, 259p., ill., tabs. Includes index. ISBN 8521614527 (Paperback).
3. ASHENDEN, Peter J. The designer's guide to VHDL. 3rd ed. Amsterdam; Burlington: Elsevier: M. Kaufmann, c2008. xxii, 909 p., ill. (The Morgan Kaufmann series in systems on silicon). Includes references and index. ISBN 9780120887859 (hardcover).
4. HWANG, Enoch O. Digital logic and microprocessor design with VHDL. Toronto: Thomson, 2006. 588p., ill. ISBN 0534465935 (hardcover).



5. HEXSEL, Roberto A. Digital systems and microprocessors. Curitiba: Ed. UFPR, 2012. 304p., ill. (Didática, n.77). Includes references and index.

TE356 - OPTICAL AND WIRELESS COMMUNICATION SYSTEMS

Syllabus: Optical fibers: step index, graded index, single-mode and multimode. Dispersion and losses, manufacturing. Semiconductors: light emission process, LEDs and lasers, fiber coupling, photodetectors, receivers, noise and sensitivity, optical amplification. Optical modulation and wavelength division multiplexing. Optical networks. Wireless channel: channel models, losses and shadowing, fading, radio link systems. Modulation: diversity, adaptive, multiple inputs and outputs (MIMO), equalization, multicarrier, medium access control. Wireless networks.

Bibliography

1. TANENBAUM, A., Computer Networks, Pearson
2. GOVIND P. Agrawal, Fiber-optic communication systems, Wiley-Interscience
3. RAPPAPORT, Theodore S., Wireless Communications: principles and practice. Prentice Hall.
4. **Complementary Bibliography**
5. CRISP, John, Introduction to Fiber Optics. Oxford.
6. LEE, William C.Y., Wireless and Cellular telecommunications. McGraw-Hill.
7. BUCK, John, Fundamentals of optical fibers, Wiley-Interscience.
8. Coelho, Paulo Eustáquio: "Projeto de Redes Locais com Cabeamento Estruturado". Instituto Online (www.institutoonline.com.br), 2003;

TE363 - DIGITAL PROCESS CONTROL

Syllabus: Computer control theory, reconstruction and quantization, relationship with continuous-time systems, poles and zeros. Design of discrete equivalents of continuous controllers, backward, forward, and Tustin approximations, sampling period selection, digital



PID. Analysis of closed-loop digital control systems, stability and Jury criterion, phase and gain margins, steady-state error analysis, model error sensitivity. Pole placement control, input/output approach, RTS control law, Pole placement control, state-space approach, sampling of state-space systems including transport delay case, state feedback regulation, observers, estimators, and output feedback.

Bibliography

1. OGATA, Katsuhiko. Modern Control Engineering. São Paulo: LTC, c2010, 5th ed. ISBN: 978-85-7605-810-6 (paperback)
2. MORAES, Cícero C.; Castrucci, Plínio de L. Industrial Automation Engineering 2nd Edition, LTC.
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Complementary Bibliography

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Syllabus: Administration in engineering. Administrative functions: planning, organization, direction, and control. Business functions: production and operations, human capital, marketing, and finance. Business creation. Business strategy. Professional and business legislation.

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9TH PERIOD

TE343 - FUNDAMENTALS OF ECONOMICS FOR ENGINEERS

Syllabus: Economic Theory: Notions of Microeconomics and Macroeconomics. Simple and Compound Interest. Debt Amortization Systems. Market Rates. Inflation and Exchange Rate Variations. Depreciation Methods. Investment Analysis. Investment Analysis under Risk and Uncertainty Conditions. Cost Analysis. Economics Applied to Electrical Engineering.

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TE347 - UNDERGRADUATE THESIS I

Syllabus: Activities to complement professional training, supervised by course faculty, resulting in a final course project proposal with technical and economic feasibility. The Undergraduate Thesis is regulated by a specific resolution of the Course Council.

Bibliography

1. KÖCHE, J. C. Fundamentals of scientific methodology: theory of science and research practice, 34th ed. Petrópolis (RJ): Vozes, 2015, 182 p. ISBN 9788532618047;
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Complementary Bibliography

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3. BASEIO, M. A. F. et al. Scientific Methodology, 2nd ed., São Paulo: Copacabana, 2014, 106 p. ISBN 9788563912114;
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5. MEDEIROS, J. B. Scientific Writing: The practice of annotations, summaries, reviews, 7th ed., São Paulo: Atlas, 2005, 326 p. ISBN 8522441057.

TE370 - INTERNSHIP

Syllabus: Supervised work in the areas of electrical engineering, electronics, telecommunications, or embedded electronic systems, in companies, industries, or teaching and research institutions.

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10TH PERIOD

TE346 - ELECTRICAL ENGINEERING AND SOCIETY

Syllabus: Professional regulation. Responsibilities of the Engineer. Areas of activity of the Engineer. Evolution of Engineering. The Engineer and Society. Engineering and industrial development. Human Rights and Democracy. Afro-Brazilian and Indigenous History and Culture and reflections in Electrical Engineering. Biosphere and its balance. Effects of technology on ecological balance. Preservation of natural resources. Environmental risks.

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TE348 - UNDERGRADUATE THESIS II

Syllabus: Activities to complement professional training, supervised by course faculty, resulting in a final course project. The Undergraduate Thesis is regulated by a specific resolution of the Course Council.

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1. KÖCHE, J. C. Fundamentals of scientific methodology: theory of science and research practice, 34th ed. Petrópolis (RJ): Vozes, 2015, 182 p. ISBN 9788532618047;
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