

FALL 2022 Booklist

Recommendation: please consult with the course instructor before purchasing any material.

- *1004 Hambley A.R.(2017), *Electrical engineering principles and applications*, New York: Pearson, (7E) ISBN: 978-0134484143.
- *2024 Centeno, Virgilio A., **Electrical Circuits and Devices**, Great River Learning – Customer Solutions Team. 2021. ISBN: 978-1644966778

Required Hardware:

The Lab-in-A-Box kit previously used in ECE 1004.

- *2054 (Applied Electrical Theory – ME students only)
Allan R. Hambley, **Electrical Engineering Principles and Applications Plus Mastering Engineering with Pearson eText – Access Card Package**, 7th edition, Pearson. ISBN 978-0134712871.

Students can opt to purchase:

Book + Modified Mastering access card: 0134680618

or

*SVE + Modified Mastering access card: 0134680626

or

Modified Mastering access card: 0134487001

*SVE= Student Value Edition which is the loose leaf/three-hole punched version of the text.

- *2214 Ellingson, Steven W. **ELECTROMAGNETICS** (I). i, Blacksburg, VA: VT Publishing, 2018, 225. (Available at: [Electromagnetics, Volume 1 CC BY-SA 4.0.](#)) **Author offers free access to this book.**

Neamen, D. A. **MICROELECTRONICS CIRCUIT ANALYSIS AND DESIGN**. iv, New York: McGraw-Hill Education, 2009, 1392. ISBN: 978-0073380643.

Required Course Materials:

The Lab-in-A-Box kit was previously used in 1004 and 2024.

- *2514 Riley, David, and Kenny A. Hunt. **COMPUTATIONAL THINKING FOR THE MODERN PROBLEM SOLVER**. i, Boca Raton Florida: CRC Press, 2014, 405. ISBN: 978-1466587779
(Available in the VT online library:
<http://proquest.safaribooksonline.com.ezproxy.lib.vt.edu/9781466587793>)

Required Software:

1. Modeling and simulation software, such as MATLAB and Simulink.

2. Linux virtual machine and software development environment (open source).
3. Unmanned aircraft simulation and ground station software (open source).

Required Field Equipment:

A technology platform suitable for project-based learning, such as a ready-to-fly quadcopter (provided by the department).

- *2544** M. Morris Mano, Charles R. Kime, Tom Martin, **Logic and Computer Design Fundamentals**, 2015. 5th edition, PEARSON. ISBN 978-0133760637.
- *2564** **No textbook required.**
- *2714** Oppenheim, A. V., Willsky, A. S., and Nawab, S. H. **SIGNALS AND SYSTEMS**. ii, Pearson, 1996, 1000. ISBN: 978-0138147570 or ISBN-10:0138147574
- *2804** **No textbook required.**
- *3004** Charles K. Alexander and Matthew N. O. Sadiku, **Fundamentals of Electric Circuits**, 7th edition, McGraw-Hill. ISBN: 978-1260226409.
- *3054** Hambley Allan R., **Electrical Engineering Principles and Application** (7E), New York: Pearson (2017), ISBN: 978-0134484143. Students should have from taking ECE 2054.
- *3074** **No textbook required.** All required materials will be made available electronically.
- *3105** Ellingson, Steven W. (2018) **Electromagnetics, Vol. 1**. Blacksburg, VA: VT Publishing. ISBN: 978-0-9979201-9-2.
Free Electronic Book for students: <https://doi.org/10.21061/electromagnetics-vol-1> **CC BY-SA 4.0**
Author offers free access to this book.
Recommended:
Fawwz T. Ulaby, Umberto Ravaioli, **Fundamentals of Applied Electromagnetics**, 8th edition, Pearson. ISBN 978-0135199008. **NOTE: This ISBN is for the Pearson e-text access card.**
- 3106** Ellingson, Steven W. (2020) **Electromagnetics, Vol. 2**. Blacksburg, VA: Virginia Tech Publishing. ISBN: 978-1-949373-92-9
Free Electronic Book for students: <https://doi.org/10.21061/electromagnetics-vol-2>. **CC BY-SA 4.0**
Author offers free access to this book.
Recommended:
Fawwz T. Ulaby, Umberto Ravaioli, **Fundamentals of Applied Electromagnetics**, 8th edition, Pearson. ISBN 978-0135199008. **NOTE: This ISBN is for the Pearson e-text access card.**
- 3204** Donald Neamen, **Microelectronics Circuit Analysis and Design**, 4th edition, McGraw-Hill. ISBN 978-0073380643.

- 3214 Donald Neamen, **Semiconductor Physics and Devices**, 4th edition, McGraw-Hill. ISBN 978-0073529585
- 3274 **No textbook required.** ECE Department, **ECE 3274 Lab Manual**. Available on-line.
- 3304 J. D. Glover and M. S. Sarma, **Power System Analysis and Design**, Cengage Engineering, 6th edition. ISBN 978-1305632134.
- Robert W. Erikson and Dragan Maksimovic, **Fundamentals of Power Electronics**, 2nd edition, 2001, Springer Science & Business Media, Inc. ISBN 978-0792372707.
- 3354 **No textbook required.** ECE Department, **ECE 3354 Lab Manual**. Available on-line.
- 3504 Patterson, D., & Hennessey, J. (2013). **Computer Organization and Design: The Hardware/Software Interface**. Morgan Kaufmann Publishers Inc. Pp. 800. ISBN 978-0124077263.
Required Software:
Architecture simulator as specified by the instructor. There are several simulators available in the public domain at no cost.
- 3514 Carrano and Henry, **Data Abstraction and Problem Solving with C++: Walls and Mirrors**, 7th edition. Pearson. ISBN 978-0134463971.
- 3524 Negus C. (2015). **Linux Bible** (10th edition). Hoboken, NJ: John Wiley & Sons. pp. 912. ISBN 978-1119578888.
- Shaw, Z. (2014). **Learn Python the hard way: A very simple introduction to the terrifyingly beautiful world of computers and code** (3rd ed.) Boston, MA: Addison-Wesley. pp. 320. ISBN: 978-0321884916
- 3544 John Wakerly (2017), **Digital Design Principles and Practices**, 5th edition. PEARSON, pp 912. ISBN 978-0134460093.
- 3564 James F. Kurose and Keith W. Ross, **Computer Networking: A Top-Down Approach**. Pearson. 8th edition, 2021. ISBN: 978-0135928615.(Was ECE 4614) Electronic Book only. Paper copy available for rental only. ISBN: 978-0136681557
- 3574 David Thomas and Andrew Hunt. **The Pragmatic Programmer**. Addison-Wesley, 2nd edition, 2019. ISBN 978-0135957059.
- 3614 Grami, Ali. **INTRODUCTION TO DIGITAL COMMUNICATIONS**. Academic Press (Elsevier). 2015. Pp. 604. ISBN 978-0124076822.
- 3704 Oppenheim, A. V., Willsky, A. S., and Nawab, S. H. (1996). **SIGNALS AND SYSTEMS**. Pearson. 2E. pp. 1000. ISBN: 978-0138147570 or ISBN-10:0138147574

- 4104 Pozar, David M. **MICROWAVE ENGINEERING**. John Wiley. 2011.4th edition. Pp. 752. ISBN 978-0470631553.
(Co-located with 5104G)
- 4134 Saleh, B. E. A. and Teich, Malvin C. **Fundamentals of Photonics**. 2nd Edition. New York, NY: John Wiley and Sons, 2007, 1177. ISBN: 978-0471358329
(Co-located with 5134G)
- 4154 Pross, G. W., **Physics of The Earth's Space Environment**, (1st Edition), Springer, 2004, 513 pages. 978-3-642-05979-7
(Co-located with 5164 and cross-listed with AOE)
- 4164 **No textbook required.** The textbook is provided in electronic format by the instructor.
- 4194 W. G. Rees, **Physical Principles of Remote Sensing**, 3rd edition, 2013. Cambridge Univ. Press. ISBN 978-0521181167. **(Co-located with 5194)**
- 4205 Sergio Franco, **Design with Operational Amplifiers and Analog Integrated Circuits**, McGraw-Hill, 3rd edition, 2005. ISBN 978-0072320848.
- 4220 Behzad Razavi, **Design of Analog CMOS Integrated Circuits**, McGraw-Hill, 2nd edition, 2016. ISBN: 978-0072524932.
- 4224 Robert W. Erikson and Dragan Maksimovic, **Fundamentals of Power Electronics**, 2nd edition, 2001, Springer. ISBN 978-0792372707.
***PDF version available on-line. Free for students. Ask the instructor.**
- 4324 **No textbook required.**
- 4334 J. D. Glover and M. S. Sarma, **Power System Analysis and Design**, Cengage Engineering, 6th edition. ISBN 978-1305632134.
- 4414/CS 4224 co-located with ECE 5414/CS 5264.
Love, R. **Linux Kernel Development** 3E. Upper Saddle River, NJ: Addison-Wesley. 2010. Pp. xxv, 440. ISBN: 978-0672329463
- Recommended:**
- Bovet, D. P., & Cesati, M. (2005). **Understanding the Linux Kernel** 3E. Sebastopol, CA: O'Reilly. Pp. xvi, 944. ISBN: 978-0596005658
- Corbet, J., Rubini, A., & Kroah-Hartman, G. **Linux Device Drivers** (3rd ed.). 2005. Sebastopol, CA: O'Reilly. Pp xvii, 640. ISBN: 978-0596005900

-Love, R. **Linux System Programming: Talking Directly to the Kernel and C Library**. 2E, 2013. Sebastopol, CA: O'Reilly. Pp. xx, 456. ISBN-13: 978-1449339531.

-Mauerer, W. **Professional Linux Kernel Architecture** (1st ed.). 2008. Indianapolis, IN: Wiley. Pp xxx, 1368. ISBN: 978-0470343432

4424 The CS instructor will use these texts Fall 2022:

Required:

Christopher M. Bishop, **Pattern Recognition and Machine Learning**.(2nd ed.).Springer. ISBN: 978-0387310732

Recommended:

Trevor Hastie, Robert Tibshirani, Jerome Friedman, **The Elements of Statistical Learning: Data Mining, Inference, and Prediction**. (2nd ed.) Springer. ISBN: 978-0387848570

Ian Goodfellow, Yoshua Bengio, Aaron Courville, **Deep Learning**. The MIT Press. 2016. ISBN: 978-0262035613

ECE sections will use:

Recommended:

Kevin Murphy, **Probabilistic Machine Learning: An introduction**. MIT Press, 2022. ISBN 978-0262046824.

(Cross-listed with CS 4824)

Recommended

Marc Deisenroth, **Mathematics for Machine Learning**, 1 Edition. Cambridge University Press, 2020. ISBN: 978-1108455145

(Cross-listed with CS 4824)

4524 Stuart Rusell and Peter Norvig, **Artificial Intelligence: A Modern Approach**, 4th Edition, 2020. 1152 pp. Pearson. ISBN: 978-0134610993.

4525 Mat Buckland, **Programming Game AI by Example**, Wordware Game Developers Library, 1st Ed. 2004. ISBN-978-1556220784

4540 Weste and Harris, **CMOS VLSI Design: A Circuits and Systems Perspective**, 4th edition, 2010. Pearson. ISBN 978-0321547743. Also available in eText version ISBN: 978-0133001471.

4554 Richard Szeliski, **Computer Vision: Algorithms and Applications**, 1E. Springer-Verlag, 2011. ISBN 978-1848829343. **(Colocated with 5554)**
Book available for free in a PDF format: <http://szeliski.org/Book/>

4560 Ed Skoudis with Tom Liston, **Counter Hack Reloaded**, 2nd edition, Prentice-Hall. ISBN 978-0131481046.

4564 **No cost to students** (Full-texts available thru VT Library Safari service)

S. Monk, **Programming the Raspberry Pi: Getting Started with Python**, Tab Books, 2012. (ISBN 978-0071807838).

B. Rhodes and J. Goerzen, **Foundations of Python Network Programming**, Apress, 3rd ed., 2014, ISBN 9781430258544

TJ O'Connor, **Violent Python : A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers**, Elsevier/Syngress, 2012, ISBN 978-1597499644

P. Waher, **Learning Internet of Things**, Packt Publishing, 2015, ISBN 978-1783553532

Other resources will be available from on-line sites including the Virginia Tech Library's e-book and full-text database offerings.

Each student will receive the following hardware for use during the semester:
Raspberry Pi 3 - Model B
32 GB MicroSD Card
Power Supply with micro-USB Cable

4574 **No textbook required.**

4580 Burger and Burge, **Digital Image Processing**, 2nd edition, Springer-Verlag, 2016, ISBN 978-1447166832. **Book used Fall 22.**

4584 **ME teaches. Please consult ME instructor. No textbook required**

Students will be provided with copies of these workbooks.

- Student Workbook: Robotics Experiment with Serial Robots
- Student Workbook: Programming of Mobile Robots

4624 J. G. Proakis and D. G. Manolakis, **Digital Signal Processing: Principles, Algorithms, and Applications**, 4th edition, PEARSON, 2006. ISBN 978-0131873742.

4634 Ali Grami, **Introduction to Digital Communications**, Academic Press(Elsevier), 1st, 2015. ISBN 978-0124076822.

4664 **No textbook required.**

4684 Mung Chiang, **20 Questions About Networked Life**, Cambridge UK: Cambridge University Press, September 2012, 503.

RECOMMENDED:

David Easley and John Kleinberg, **Networks, Crowds and Markets: Reasoning About A Highly Connected World**, Cambridge UK: Cambridge University Press, 2010, 744.

Martin E. Newman, Networks: An Introduction, Oxford UK: Oxford University Press, 2010, 720.

4805 & 4806 (Senior Design Project)

Patrick Lencioni, The 5 Dysfunctions of a Team. John Wiley & Sons. 1st. 2010. ISBN: 978-0787960759.

5014 No Textbook Required

Online Articles:

Whitfield, J.D., Yan, J., Wang, W., Heath, J.T., and Harrison, B., 2022. Quantum Computing 2022. arXiv preprint arXiv:2201.09877 <https://arxiv.org/abs/2201.09877>

Scranton, Philip. "Technology, science and American innovation." Business History 48, no. 3 (2006): 311-331

<https://www.tandfonline.com/doi/full/10.1080/00076790600791763>

5104G Pozar, David M. MICROWAVE ENGINEERING. John Wiley. 2011.4th edition. Pp. 752. ISBN 978-0470631553.

(Co-located with 4104)

5105 Jian-Ming Jin, Theory and Computation of Electromagnetic Fields, 2nd edition, Wiley. ISBN 978-1119108047.

5134G Saleh, B. E. A. and Teich, Malvin C. Fundamentals of Photonics. 2nd Edition. New York, NY: John Wiley and Sons, 2007, 1177. ISBN: 978-0471358329

(Co-located with 4134)

5164 Prohss, G. W., Physics Of The Earth's Space Environment, (1st Edition), Springer, 2004, 513 pages. 978-3-642-05979-7

(Co-located with 4154/AOE 4654)

5174 F. F. Chen, Introduction to Plasma Physics and Controlled Fusion, 3rd edition. Springer.

ISBN 978-3319223087.

(Cross-listed and taught by AOE)

5194 W. G. Rees, Physical Principles of Remote Sensing, 3rd Edition, 2013. Cambridge Univ. Press. ISBN 9780521181167. **(Co-located with 4194)**

5200 Jasprit Singh, Electronic and Optoelectronic Properties of Semiconductor Structures, Cambridge University Press, 2007. ISBN 978-0521035743 -Paperback. **(Cross-listed with MSE)**

5204 Baliga, G. J., Fundamentals of Power Semiconductor Devices, 2nd edition. 2018. Springer. ISBN: 978-3319939872.

5234 Henry Ott, Noise Reduction Techniques in Electronic Systems, 1E edition, John Wiley. ISBN 978-0470189306.

5254 **No textbook required.**

5314 A. J. Wood and B. F. Wollenberg, Power Generation, Operation, and Control, John Wiley, 2013, 3rd edition. ISBN 978-0471790556.

5414/CS 5264. Co-located with ECE 4414/CS 4224

Love, R. Linux Kernel Development (3rd ed.). Upper Saddle River, NJ: Addison-Wesley. 2010. Pp. xxv, 440. ISBN: 978-0672329463

Recommended:

-Bovet, D. P., & Cesati, M. (2005). Understanding the Linux Kernel (3rd ed.). Sebastopol, CA: O'Reilly. Pp. xvi, 944. ISBN: 978-0596005658

-Corbet, J., Rubini, A., & Kroah-Hartman, G. (2005). Linux Device Drivers (3rd ed.). Sebastopol, CA: O'Reilly. Pp xvii, 640. ISBN: 978-0596005900

-Love, R. (2013). Linux System Programming: Talking Directly to the Kernel and C Library (2nd ed.). Sebastopol, CA: O'Reilly. Pp. xx, 456. ISBN-13: 978-1449339531.

-Mauerer, W. (2008). Professional Linux Kernel Architecture (1st ed.). Indianapolis, IN: Wiley. Pp xxx, 1368. ISBN: 978-0470343432

5424 Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012. 1st Ed. ISBN 978-0262018029. **The ECE instructor will use this textbook for Fall 22**

5480 Pfleeger, C., Pfleeger, S., & Margulies, J. (2015). Security in Computing, 5th ed. Prentice Hall. Pp. xxxiii, 944. ISBN: 978-0134085043 **(on-line – MIT only)**

5484 L. Null and J. Lobur, The Essentials of Computer Organization and Architecture, 5th edition, Jones and Bartlett Publishers. ISBN 978-1284123036 **(on-line – MIT only)**

5485 James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, Pearson. 7th edition, 2016. ISBN: 978-0133594140. **(on-line – MIT only)**

5504 Online course. **No textbook required. Cross-listed with CS.**

5510 Maurice Herlihy, Nir Shavit, Victor Luchangco, and Michael Spear, The Art of Multiprocessor Programming, Morgan Kaufman, 2E. 2020. ISBN 978-0124159501. **(Cross-listed-ECE teaches for Fall 22)**

5554 Richard Szeliski, Computer Vision: Algorithms and Applications, 1E. Springer-Verlag, 2011. ISBN 978-1848829343. **(Same room as 4554)**
Author offers free access in a PDF format: <http://szeliski.org/Book/>

5560/CS 5560

William Stallings, Cryptography and Network Security – Principles and Practices, 8th edition, Pearson, 2019. ISBN: 978-0135764039. *This ISBN is for the Pearson eText access card, no desk copies available*

NOTE: *Pearson eText is a fully digital delivery of Pearson content and should only be purchased when required by your instructor. This ISBN is for the Pearson eText access card. In addition to your purchase, you will need a course invite link, provided by your instructor, to register for and use Pearson eText.*

5565 CS is teaching this course. Please consult the CS Instructor. Instructor will provide lecture materials.

(Cross-listed with CS)

5584 CS is teaching this course. Please consult the CS Instructor.

Charlie Kaufman, Radia Perlman and Mike Speciner. Network Security: Private Communication in a Public World, Series in Computer Networking and Security, 2nd edition, Prentice Hall. ISBN-978-0130460196.

(Cross-Listed, CS teaches Fall 2022)

5585 (IT Security & Trust – MIT only)

Ed Skoudis. CounterHack Reloaded: A Step by Step Guide to Computer Attacks and Effective Defenses, 2nd edition, Prentice Hall. ISBN 978-0132704533. **(on-line – MIT only)**

5605 Alberto Leon-Garcia, Probability & Random Processes for Electrical Engineering, 3rd edition, 2008, Addison-Wesley. ISBN: 978-0131471221 **Cross-listed with BMES.**

5674 Jeffrey H. Reed, Software Radio, A Modern Approach to Radio Design, 1E, 2002. Prentice-Hall. ISBN 978-0130811585.

5704 Andrew J. Kurdila, Pinhas Ben-Tzvi, Dynamics and Control of Robotic Systems. 1E, 2019. Wiley. 978-1-119-52495-3--ebook, 978-1-119-52483-0--paper copy.

5744 Wilson J. Rugh, Linear Systems Theory, 2nd edition, Prentice-Hall. ISBN 978-0134412054.

(Cross-listed with ME and AOE)

5754 Williams and Lawrence, Linear State-Space Control Systems, 1st edition, 2007. John Wiley. **(Cross-listed with ME and AOE) ME teaches -Fall 2022. Book available for free in pdf format. See professor for link.**

5774 AOE is teaching this course. Please consult AOE Instructor.

H. Kahlil, Nonlinear Systems, 3rd edition. Pearson. 2002. ISBN 978-0130673893.

AOE teaches- Fall 2022. (Cross-listed with ME and AOE)

- 5805** Patrick Lencioni, **The 5 Dysfunctions of a Team**. John Wiley & Sons. 1st. 2010. ISBN: 978-0787960759.
- 5806** Patrick Lencioni, **The 5 Dysfunctions of a Team**. John Wiley & Sons. 1st. 2010. ISBN: 978-0787960759.
- 5944** **No textbook required.**
- 5984** **Special Study: Power Systems Under Abnormal Operating Conditions. CC Liu.**
No textbook required. (Fall 22)
- 5984** **Special Study: Nonlinearity & Prediction. Lenny Smith**
No textbook required. Consult with the instructor for the list of recommended texts.
(Fall 22)
- 5984** **Special Study: Math Methods for ECE. Zin Lin**
Thomas Holton. **Digital Signal Processing**. 1E. Cambridge University Press, 2021, ISBN: 978-11084188447 **(Fall 22)**
- 6104** **Advanced Topic: Quantum Optics for Engineers. Ravi Raghunathan.**
No Textbook Required.
- 6124** Jian-Ming Jin, **Theory and Computation of Electromagnetic Fields**, 2nd edition, Wiley. ISBN 978-1119108047.
- 6204** **Advanced Topic: Bioelectronics**
No textbook required.
Recommended:
-J. H. Martin et al., in Principles of Neuroscience, edited by E. R. Kandel, J.H.Schwartz, and T. J. Jessel (Norwalk: Appleton and Lange, 2000), p. 340-352. ISBN: 9780071390118
-Fundamentals of microfabrication 2nd or 3rd edition by M.J. Madou. ISBN: 0849308267
-Flexible Electronics: Materials and Applications (Electronic Materials: Science & Technology) by William S. Wong and Alberto Salleo (Paperback - Dec 8, 2010) Springer, 480pp Liens Moodle. ISBN: 0387743626
- 6504** **Advanced Topic: Stochastic Approx & App**
Recommended:
R. S. Sutton and A. G. Barto, Introduction to Reinforcement Learning, 2015. ISBN-13: 978-0262193986
V. Borkar, Stochastic Approximation: A Dynamical Systems Viewpoint, 2008. ISBN-13: 978-0521515924
D. Bertsekas and J. N. Tsitsiklis, Neuro-Dynamic Programming, 1997. ISBN-13: 978-1886529106
T. Basar and G. J. Olsder, Dynamic Noncooperative Game Theory, 1998. ISBN:978-0-89871-429-6

6554 No textbook required.

6634 No textbook required.