Spring 2025 Book List

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

1004 Hambley, Allan R.**, Electrical Engineering Principles and Applications** (7E), New York: Pearson (2017), ISBN: 9780134484143.

2024 Hambley, Allan R.**, Electrical Engineering Principles and Applications** (7E), New York: Pearson (2017), ISBN: 9780134484143.

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: 9780134712871.

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.

2164 J. J. Sellers, **Understanding Space: An Introduction to Astronautics** (3rd Edition), McGraw Hill, 2005. ISBN: 9780077230302.
CROSS LISTED WITH AOE 2664
(ECE teaches Spring 2025)

2214 Ellingson, Steven W. **Electromagnetics** (I). Blacksburg, VA: VT Publishing, 2018, 225. (Available at: **https://doi.org/10.21061/electromagnetics-vol-1 CC BY-SA 4.0.**) **Author offers free access to this book.**

Neamen, D. A. **Microelectronics Circuit Analysis and Design**. 4th edition, New York: McGraw-Hill Education, 2009, 1392. ISBN: 9780073380643.

Required Course Materials:
The Lab-in-A-Box kit that 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. ISB: 9781466587779.

Available on the VT online library:

https://ebookcentral.proquest.com/lib/vt/detail.action?docID=1524329

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: 9780133760637.

2564 **No textbook required**

2714 Oppenheim, A. V., Willsky, A. S., and Nawab, S. H. **Signals and Systems**. ii, Pearson, 1996, 1000. ISBN: 9780138147570.

2804 **No textbook required**

3004 Charles K. Alexander and Matthew N. O. Sadiku, **Fundamentals of Electric Circuits**, 7th edition, McGraw-Hill. ISBN: 9781260226409.

3054 Hambley Allan R., **Electrical Engineering Principles and Application** (7E), New York: Pearson (2017), ISBN: 9780134484143.
Students should have from taking 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: 9780997920192.
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: 9780135199008.
NOTE: This ISBN is for the Pearson eText access card.

3106 Ellingson, Steven W. (2020) **Electromagnetics, Vol. 2**. Blacksburg, VA: Virginia Tech Publishing. ISBN: 9781949373929.
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: 9780135199008.
NOTE: This ISBN is for the Pearson eText access card.

3134 Kasap, S.O., **Optoelectronics & Photonics: Principles & Practices**, 2nd Edition, Pearson, 2012, ISBN: 9780132151498.

3204 Donald Neamen, **Microelectronics Circuit Analysis and Design**, 4th edition, 2009. McGraw-Hill. ISBN: 9780073380643.

3214 Donald Neamen, **Semiconductor Physics and Devices,** 4th edition, McGraw-Hill. ISBN: 9780073529585.

3254 **(Applied Electrical Theory – ME students only)**
Allan R. Hambley, **Electrical Engineering Principles and Applications– Access Card Package**, 7th edition, PEARSON. ISBN: 9780134712871.

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.
STUDENTS SHOULD HAVE FROM TAKING ECE 2054

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: 9781305632134.

Robert W. Erikson and Dragan Maksimovic, **Fundamentals of Power Electronics**, 2nd edition, 2001, Springer Science & Business Media, Inc. ISBN: 9780792372707.

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**, 5th edition. Morgan Kaufmann Publishers Inc. Pp. 800. ISBN: 9780124077263.

Required Software:
Architecture simulator as specified by the instructor. There are several simulators available in the public domain at no cost.

3514 Carrano, F. & Henry, T. (2016). **Data abstraction and problem solving with C++: Walls and mirrors**, (7th Edition) London, United Kingdom: Pearson. pp. 864.ISBN: 9780134463971.

3544 John Wakerly, (2017). **Digital Design Principles and Practices**, (5th edition) Pearson. ISBN: 9780134460093.

3564 James F. Kurose and Keith W. Ross, **Computer Networking: A Top-Down Approach**. Pearson. 8th edition, 2021. ISBN: 9780135928615. Electronic Book only. Paper copy available for rental only. ISBN: 9780136681557.

3574 David Thomas and Andrew Hunt. **The Pragmatic Programmer.** Addison-Wesley, 2nd edition. 2020. ISBN: 9780135957059.
Recommended:
Martin, Robert C. (2009). **Clean Code**, Pearson, ISBN:9780132350884.

Hunt, Andrew and Thomas, David, (2000). **The Pragmatic Programmer**. Addison Wesley. ISBN: 9780201616224.

3604 Ellingson, S.W. (2016). **Radio Systems Engineering**, Cambridge University Press, pp. 650. ISBN: 9781107068285.

3614 Grami, Ali (2015). **Introduction to Digital Communications.** Academic Press (Elsevier), pp. 604. ISBN: 9780124076822.

3704 Oppenheim, A. V., Willsky, A. S., and Nawab, S. H. (1996). **Signals and Systems**. Pearson. 2E. pp. 1000. ISBN: 9780138147570.

3714 Nise, Norman S. (2020). **Control Systems Engineering**. 8th Edition, John Wiley and Sons. 800pp. ISBN: 9781119721406.

4110 **No textbook required.**
A lab manual will be provided that describes the theory of the laboratory exercises and also the laboratory procedure.

Recommended:

Quantum engineering fundamentals can be found in the text, Wong, Thomas, **Introduction to Classical and Quantum Computing**, Root Groove, 2022, pp. 382. ISBN: 9798985593105.
Free pdf online:
https://www.thomaswong.net/introduction-to-classical-and-quantum-computing-1e3p.pdf

4114 Stutzman and Thiele, **Antenna Theory and Design**, 3rd edition, John Wiley. ISBN: 9780470576649.

4124 John S. Seybold, **Introduction to RF Propagation**, John Wiley, 1st edition, 2005. ISBN: 9780471655961.

4144 T.-C. Poon and J.-P. Liu, **Introduction to Modern Digital Holography**, Cambridge Univ. Press. 1st edition, 2014. ISBN 9781107016705.

4174 Prölss, G. W., **Physics of the earth's space environment**,1st Ed. Berlin: Springer, 2004. Pp. xv, 513. ISBN: 9783540214267. **Taught by AOE Spring 2025 (Cross-listed with AOE)**

4234 Plummer, James D. and Griffin, Peter B., **Integrated Circuit Fabrication Science and Technology,** 1st edition**,** 2024**,** Cambridge University Press**,** ISBN: 9781009303583.

4254 **No textbook required.** **Co-located with ECE 5224**

4314 Kersting, W. H., (2018), **Distribution System Modeling and Analysis**, 4th Ed., CRC Press, 1-518. ISBN: 9781498772136. (hardcover) ISBN: 9781315120782. (eBook)

Cooper Power Systems, (1990), **Electrical Distribution System Protection**, 3rd Edition, 1-165. **(The electronic version of this manual will be made available to students by the instructor).**

4354 Stanley H. Horowitz and Arun G. Phadke, **Power System Relaying**, 4th edition. John Wiley. ISBN: 9781118662007.

4364/5374G
No textbook required. **Instructor provides a free online textbook.**

4414/CS 4224 **No textbook required.**. **(Cross-listed with CS) Taught by CS Spring 2025**

Optional Books:
- Linux Kernel Development, 3rd Edition, by Robert Love ISBN: 9780672329463.

- Linux Kernel Programming: A comprehensive and practical guide to kernel internals, writing modules, and kernel synchronization , Second Edition, by Kaiwan N. Billimoria ISBN: 9781803232225.
- Linux Device Drivers, 3rd Edition, by Jonathan Corbet, Alessandro Rubini, and Greg Kroah-Hartman ISBN: 9780596005900.

4424/CS4824

(Cross-listed with CS) Taught by CS Spring 2025
No textbook required

4514 **No textbook required**

4524 Stuart Russell and Peter Norvig, **Artificial Intelligence: A Modern Approach,** 4th Edition, 2020. 1152 pp. Pearson. ISBN: 9780134610993.

4550/5550G

Giorgio C. Buttazzo, **Hard Real-Time Computing Systems: Predictable Scheduling Algorithms and Applications**, 3rd edition, Springer. ISBN: 9781461406754.
Same room as 5550G

4560 Ed Skoudis with Tom Liston, **Counter Hack Reloaded**, 2nd edition, Prentice-Hall. ISBN: 9780131481046.

4564 **No cost to students** (Full-text 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 978-1430258544.

TJ O'Connor, **Violent Python : A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers, Elsevier/Syngress**, 2012, ISBN: 9781597499644.

P. Waher, **Learning Internet of Things**, Packt Publishing, 2015, ISBN: 9781783553532.
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

4644 Timothy Pratt and Jeremy Allnut, **Satellite Communications**, 3rd ed., 2020, John Wile & Sons Ltd. E-book ISBN: 9781119482055, Hardcover ISBN 9781119482178.

4704 **No textbook required.** Consult with the instructor.

4805 & 4806 (Senior Design Project)

Patrick Lencioni, **The 5 Dysfunctions of a Team**, 2010. John Wiley & Sons. ISBN: 9780787960759.

4944 Required reference materials will be made available electronically.

5106 Jian-Ming Jin. **Theory and Computation of Electromagnetic Fields**, 2010, Wiley. 2nd edition, ISBN 9781119108047.

5114 **No textbook required.**
A lab manual will be provided that describes the theory of the laboratory exercises and also the laboratory procedure.

Recommended:
Quantum engineering fundamentals can be found in the text, Wong, Thomas, **Introduction to Classical and Quantum Computing**, Root Groove, 2022, pp. 382. ISBN: 9798985593105.
Free pdf online:
https://www.thomaswong.net/introduction-to-classical-and-quantum-computing-1e3p.pdf

5174 F. F. Chen**, Introduction to Plasma Physics and Controlled Fusion,** 3rd edition. Springer. ISBN 9783319223087.
(Cross-listed and taught by AOE Spring 2025)

5205 Dieter K. Schroder, **Semiconductor Material and Device Characterization**, 2006, 3rd edition, John Wiley. ISBN 9780471739067.

5210 Marc J. Madou, **Fundamentals of Microfabrication and Nanotechnology**. 3rd edition, CRC Press. 2011. ISBN: 9780849331800.

Recommended:
Stephen D. Senturia, **Microsystem Design,** 2nd edition, Springer. ISBN: 9780792372462.

5224 **No textbook required. Co-located with ECE 4254.**

5244 **No textbook required.**

5274 **No textbook required**
Lecture notes provided by the instructor via website, “Modeling and Control of Three-Phase PWM Converters.”
A list of publications related to the subject.

5284 **No textbook required**

5344 **No textbook required**

5374G/4364 **No textbook required**

5404 Behzad Razavi.(2016) **Design of Analog CMOS Integrated Circuits,** McGraw Hill. 2nd edition. ISBN: 9780072524932.

Recommended:
Baker, R. Jacob. **CMOS Circuit Design, Layout, and Simulation**, 3rd Edition, Wiley-IEEE Press, 2010, Pp 1072, ISBN 9780470881323.

Provided: Cadence Virtuoso Custom IC Design Tools Students will be also provided with reading material and papers to read. Paper and Lecture Note

5414/CS 5264 **No textbook required.. (Cross-listed with CS) Taught by CS Spring 2025**

Optional Books:
- Linux Kernel Development, 3rd Edition, by Robert Love ISBN: 9780672329463.
- Linux Kernel Programming: A comprehensive and practical guide to kernel internals, writing modules, and kernel synchronization , Second Edition, by Kaiwan N. Billimoria ISBN: 9781803232225.
- Linux Device Drivers, 3rd Edition, by Jonathan Corbet, Alessandro Rubini, and Greg Kroah-Hartman ISBN: 9780596005900.

5424 Kevin Murphy, **Machine Learning: A Probabilistic Perspective**, MIT Press, 2012. ISBN: 9780262018029.

5434 Platzer A. (2018). **Logical Foundations of Cyber-Physical Systems**. Springer. ISBN: 9783319635880.

5444 Shanahan, M. (2015). **The Technological Singularity**. Cambridge, MA: MIT Press. Pp. xv, 272. The book is available for free and online from the VT library.

5464 Kelleher, J. Mac Namee, B., & D’Arcy, A. (2020). **Fundamentals of machine learning for predictive data analytics: Algorithms, worked examples, and case studies** (2nd ed.). MIT Press. pp. 856. ISBN: 9780262044691.

5480 Pfleeger, Charles P., Shari Lawrence Pfleeger, and Lizzie Coles-Kemp. 2024. Security in Computing. Sixth edition. (1040 pages) . Boston: Addison-Wesley Professional. (on-line – MIT only)
Available free online:
https: //www.oreilly.com/library/view/-/9780137891375/.

5484 Null, Linda (2024). **The Essentials of Computer Organization and Architecture.** Sixth edition. Burlington, Massachusetts: Jones & Bartlett Learning. Hard copy ISBN: 9781284259438
free at VT Libraries online ISBN: 9781284259445. Essentials of Computer Organization and Architecture - Virginia Polytechnic Institute and State University (exlibrisgroup.com) (on-line – MIT only)

5494 Poole, D.L. & Mackworth, A.K. (2023). **Artificial intelligence: Foundations of computational agents**, 3rd Edition. Cambridge University Press. Free online for students: **https://artint.info/3e/html/ArtInt3e.html** ISBN: 9781009258197.

5544/CS5544 Aho, Lam, Sethi & Ullman, **Compilers: Principles, Techniques, and Tools.** 2nd Edition. Pearson. 2007. 1040pp. ISBN: 9780321486813.

5545 Weste and Harris, **CMOS VLSI Design, A Circuits and Systems Perspective**, 4th edition, 2004. Pearson. ISBN: 9780321547743.

Recommended:
Tront, Joseph G., **PSpice for Basic Microelectronics**, McGraw-Hill, 2008. ISBN 9780073529479.

5550G/4550 Giorgio C. Buttazzo, **Hard Real-Time Computing Systems: Predictable Scheduling Algorithms and Applications**, 3rd edition, Springer. ISBN: 9781461406754.

5560/CS5560 CS teaches Spring 2025

William Stallings, **Cryptography and Network Security – Principles and Practices**, 7th edition, Pearson. 2016. ISBN: 9780134444284.

5566/CS5566 No textbook required

5580 No textbook required

5586 William Stallings; Lawrie Brown**, *Computer Security: Principles and Practice*,** Pearson, 4th edition. ISBN: 9780134794105. **(On-Line – MIT Only)**

5590/CS5590 CS teaches Spring 2025
No textbook required

5606 H. Vincent Poor**, An Introduction to Signal Detection and Estimation,** 2nd edition, Springer. 1994. ISBN: 9781441928375.

5620 John G. Proakis and Dimitris G. Manolakis, **Digital Signal Processing: Principles, Algorithms, and Applications**, 4th edition, 2006, Prentice-Hall. Student edition of Matlab. ISBN: 9780131873742.

5634 Thomas M. Cover and Joy A. Thomas, **Elements of Information Theory,** 2nd Edition 2006, Wiley. ISBN: 9780471241959.

5636 M.A. Richards, **Fundamentals of Radar Signal Process,** 1E, 2005, McGraw-Hill, ISBN: 9780071444743.

5654 John Proakis, **Digital Communications**, 5th edition, 2008. McGraw-Hill. ISBN 9780071263788.

5664 Nishith Tripathi and Jeffrey H. Reed, **Cellular Communications: A Comprehensive and Practical Guide**, 2014, Wiley-IEEE Press. ISBN: 9780470472071.

5714 **(Zoom course – originates Northern VA)** Class notes and papers will be provided.
No textbook required

5734 **Cross-listed with AOE 5734 & ME 5584-Taught by AOE Spring 2025**
Boyd, S. & Vandenberghe, L. (2004). **Convex Optimization.** New York: Cambridge University Press. Pp. xiv, 730. ISBN: 9780521833783. (Hardcover)

5764/AOE5764/ME5564 Taught by ME Spring 2025
No textbook required. All course materials will be provided by the instructor through course notes.

5944 **No textbook required**

5984 **SS: Quantum Information Technologies (MIT-Zin Lin)**

Sutor, Robert, **Dancing with Qubits.** Packt Publishing. 2019. ISBN: 9781838827366.

5984 SS: Adv Satellite Communication (J. Ruohoniemi)
Timothy Pratt and Jeremy Allnut, **Satellite Communications**, 3rd ed., 2020, John Wiley & Sons Ltd. E-book ISBN: 9781119482055, Hardcover ISBN: 9781119482178.

5984 SS: NextG Mobile Networks (MIT-A. Soysal)
No textbook required

5984 SS: Bioelectronics (X. Jia)
No textbook required

Recommended reference text:
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: 9780849308260.

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: 9780387743622.

5984 SS: RFIC Design (J. Walling)
Razavi, Behzad. **RF Microelectronics**, 2nd Edition, Prentice Hall, 2011. ISBN-13: 9780137134731.

5984 SS: PE & Sys for Future Grid (R. Zhang)
No Textbook Required

5984 SS: Critical Eng of Emerging Tech (N. Tryfona)
No Textbook Required

5984 SS: Industry Topics & Professionalism (T. Talty)
No textbook required

5984 Risk Estimation & Simulation (L. Smith)
No textbook required

Recommended:

1. Thompson. Escape from Model Land: How Mathematical Models Can Lead Us Astray and What We Can Do About It
2. Pilkey and Pilkey. Useless Arithmetic, Columbia University Press
3. Oberkampf and Roy. Verification and Validation in Scientific Computing, CUP

4. J Wang. What Every Engineer Should Know About Risk Engineering and Management, CRC Press
5. Wijenayake et al. Linking Climate Change Adaptation, Disaster Risk Reduction, and Loss & Damage, Palgrave
6. Kent. Sherman Kent and the Board of National Estimates Michigan
7. Smith, L.A. (2016) 'Integrating Information, Misinformation and Desire: Improved Weather-Risk management for the Energy Sector', in Aston, P.J., Mulholland, A.J. & Tant, K.M.M. (ed.) UK Mathematical Success Stories in Industrial Mathematics, 289-296. Springer
8. UNDRR (United Nations Office for Disaster Risk Reduction) 2017. UNDRR Terminology on Disaster Risk Reduction 2017

6204 TS Unconditionally Secure Electronics

No Textbook Required

Electronic handouts (without solutions) are provided. Paired with the notes taken during class attendance, the material is sufficient for preparation.

Recommended:

L. B. Kish, "The Kish Cypher: The Story of KLJN for Unconditional Security," World Scientific 2017 ISBN: 9789814449458.

Mark Stamp, "Information Security," Wiley & Sons, 2006 (Note: There are some errors in it.) ISBN: 9780471744184.

Bruce Schneier, "Applied Cryptography," Wiley & Sons, 1996, 2016 ISBN: 9780471117094.

6474 No textbook Required

6504 TS: Activ Inferenc Autom Sys-C. Wyatt

No textbook required - Primary readings from journal publications.

Recommended:

Parr T., Pezzulo G., Friston K.J, **Active Inference: The Free Energy Principle in Mind, Brain, and Behavior**, The MIT Press, 312 pp., 2022. ISBN: 9780262045353.

6524 No textbook required

Recommended:

Free for students

Goodfellow, Ian & Bengio, Yoshua and Courville, Aaron. **Deep Learning**, MIT Press, 2016, **http://www.deeplearningbook.org/.** 780 pages.

6744 No textbook required. Taught by AOE Spring 2025
(CROSS-LISTED with AOE6744/ME6544)

6774 **No textbook required. Taught by ISE Spring 2025 (CROSS-LISTED AOE 6774 /ME6574 /ISE6574)**

Recommended:

Lavretsky, Eugene & Wise, Kevin. (2013) R**obust and Adaptive Control: With Aerospace Applications.** Springer. ISBN: 9781447143956. The following link goes to the PDF version of the textbook. **https://link.springer.com/content/pdf/10.1007/978-1-4471-4396-3.pdf**

Khalil, Hassan. (2001). **Nonlinear Systems,** Pearson. 3rd edition. ISBN: 9780130673893.