



**Colegio de San Juan de Letran**  
Dominican Avenue, Abucay, Bataan  
Library and Media Services

## **RESEARCH GUIDE: BASICS THERMODYNAMICS**

### **TABLE OF CONTENTS**

#### **I. Scope Note**

#### **II. Search Aids**

#### **III. Information Resources**

##### **A. Library Resources**

###### **a. E-Journals**

###### **b. E-Theses**

##### **B. Open Access**

###### **a. Free E-Books**

###### **b. Free E-Journals**

###### **c. Free E-Theses**

##### **C. Professional Organizations**

##### **D. Other Related Web Portals**

##### **E. Related Research Guides**

#### **IV. Tutorials**

## RESEARCH GUIDES

### BASIC THERMODYNAMICS

#### I. SCOPE NOTE

*Thermodynamics, science of the relationship between heat, work, temperature, and energy. In broad terms, thermodynamics deals with the transfer of energy from one place to another and from one form to another. The key concept is that heat is a form of energy corresponding to a definite amount of mechanical work. Britannica.*

<https://www.britannica.com/science/thermodynamics>

#### II. SEARCH AIDS (BT: Broader Term, RT: Related Term, NT: Narrow Term)

##### BT:

- Thermodynamics

##### RT:

- Laws of Thermodynamics
- Ideal gases
- Pure substances
- Cycle analysis
- Gas and vapor cycles
- Heat
- Work
- Temperature
- Energy
- Entropy
- Thermal energy
- State function
- Heat capacity
- Osmosis
- Equilibrium constant
- Reaction coordinate
- Physical properties
- Extensive property
- Intensive property
- Ionic strength
- Molality
- Electrolyte
- Activity coefficient
- Molarity and molar concentration

##### NT:

- Endothermic process

- Exothermic process
- Elements
- Compounds
- Liquid
- Solid
- Gas
- Osmotic pressure
- Equilibrium constant
- Freezing point depression
- Boiling point elevation
- Vapor pressure lowering
- Density
- Concentration
- Mass
- Volume
- Solutions
- Chemical potential for non ideal gases
- Chemical potential for ideal gases
- Ideal solution

### III. INFORMATION RESOURCES

#### A. LIBRARY RESOURCES

*Note: For the appropriate access credentials, please contact the Letran Bataan Library*

#### ➤ E-JOURNALS

- Contemporary Physics. [https://www.proquest.com/publication/publications\\_31072](https://www.proquest.com/publication/publications_31072)
- Revue des Sciences de l'Eau: Journal of Water Science. [https://www.proquest.com/publication/publications\\_396532](https://www.proquest.com/publication/publications_396532)
- Journal of Information, Intelligence and Knowledge. [https://www.proquest.com/publication/publications\\_2034840](https://www.proquest.com/publication/publications_2034840)
- Entropy. [https://www.proquest.com/publication/publications\\_2032401](https://www.proquest.com/publication/publications_2032401)
- International Journal of Mechanical Engineering Education. [https://www.proquest.com/publication/publications\\_48977](https://www.proquest.com/publication/publications_48977)
- Pure and Applied Chemistry. [https://www.proquest.com/publication/publications\\_2032616](https://www.proquest.com/publication/publications_2032616)
- Nature. [https://www.proquest.com/publication/publications\\_40569](https://www.proquest.com/publication/publications_40569)
- Metallurgical and Materials Transactions: Process Metallurgy and Materials Processing Science, B. [https://www.proquest.com/publication/publications\\_49318](https://www.proquest.com/publication/publications_49318)
- Journal of High Energy Physics. [https://www.proquest.com/publication/publications\\_2034718](https://www.proquest.com/publication/publications_2034718)
- Russian Journal of Mathematical Physics. [https://search.proquest.com/central/publication/publications\\_2043707](https://search.proquest.com/central/publication/publications_2043707)

- International Journal of Energy and Environmental Engineering.  
[https://search.proquest.com/central/publication/publications\\_2034737](https://search.proquest.com/central/publication/publications_2034737)
- Journal of Chemical Education.  
[https://search.proquest.com/central/publication/publications\\_41672](https://search.proquest.com/central/publication/publications_41672)
- Journal of Energy Technology.  
[https://search.proquest.com/central/publication/publications\\_2044830](https://search.proquest.com/central/publication/publications_2044830)
- Journal of Mathematical Chemistry.  
[https://search.proquest.com/central/publication/publications\\_2043851](https://search.proquest.com/central/publication/publications_2043851)

#### ➤ E-THESES

- Schumacher, O. (2016). Thermodynamics and kinetics of complexion transitions in europium-doped (Order No. 10125815). Available from ProQuest Central. (1796968925). Retrieved from <https://www.proquest.com/dissertations-theses/thermodynamics-kinetics-complexion-transitions/docview/1796968925/se-2?accountid=190548>
- Staron, P. J. (2013). Nonequilibrium thermodynamics of temperature gradient metamorphism in snow (Order No. 3560693). Available from ProQuest Central. (1357147313). Retrieved from <https://www.proquest.com/dissertations-theses/nonequilibrium-thermodynamics-temperature/docview/1357147313/se-2?accountid=190548>
- Guo, X. (2014). Thermodynamics of material containing actinides: Garnets, metal uranates, and uranyl peroxide (Order No. 3685218). Available from ProQuest Central. (1666436828). Retrieved from <https://www.proquest.com/dissertations-theses/thermodynamics-material-containing-actinides/docview/1666436828/se-2?accountid=190548>
- Zschau, T. (2010). The authoritarian cosmos: Complexity, elective affinities and the “thermodynamics” of the self (Order No. 3422299). Available from ProQuest Central. (756725504). Retrieved from <https://www.proquest.com/dissertations-theses/authoritarian-cosmos-complexity-elective/docview/756725504/se-2?accountid=190548>
- Webster, K. T. (2014). The thermodynamics of high frequency markets (Order No. 3627279). Available from ProQuest Central. (1558888155). Retrieved from <https://search.proquest.com/docview/1558888155?accountid=190548>
- Boyd, A. B. (2018). Thermodynamics of correlations and structure in information engines (Order No. 10689139). Available from ProQuest Central. (2047668591). Retrieved from <https://search.proquest.com/docview/2047668591?accountid=190548>
- Pegis, M. L. (2018). Using thermodynamics and mechanism to understand and improve dioxygen reduction electro- and photo electro catalysts (Order No. 10957334). Available from ProQuest Central. (2090029185). Retrieved from <https://search.proquest.com/docview/2090029185?accountid=190548>
- Brown, B. R. (2015). Developing and accessing research-based tools for teaching quantum mechanics and thermodynamics (Order No. 3735242). Available from ProQuest Central. (1749032683). Retrieved from <https://search.proquest.com/docview/1749032683?accountid=190548>

- Wyczalkowski, M. A. (2009). Advances in computational solvation thermodynamics (Order No. 3387681). Available from ProQuest Central. (305018650). Retrieved from <https://search.proquest.com/docview/305018650?accountid=190548>

## B. OPEN ACCESS

### ➤ FREE E-BOOKS

- Hutter, Koluban and Wang, Yongqi. (2016). Fluid and Thermodynamics Volume 2: Advanced Fluid Mechanics and Thermodynamic Fundamentals. Switzerland: Springer. <https://www.pdfdrive.com/fluid-and-thermodynamics-volume-2-advanced-fluidmechanics-and-thermodynamic-fundamentals-d158067288.html>
- Hutter, Koluban and Wang, Yongqi. (2016). Fluid and Thermodynamics Volume 1: Basic Fluid Mechanics. Switzerland: Springer. <https://www.pdfdrive.com/fluid-andthermodynamics-volume-1-basic-fluid-mechanics-d186370780.html>
- Dixon, S.L. (2014). Fluid Mechanics and Thermodynamics of Turbomachinery, 7<sup>th</sup> edition: Amsterdam: Elsevier. <https://www.pdfdrive.com/fluid-mechanics-and-thermodynamicsof-turbomachinery-7th-edition-d57698189.html>
- Mahmoud Massoud. (2005). Engineering Thermofluids: Thermodynamics, Fluid Mechanics, and Heat Transfer. Switzerland: Springer. <https://www.pdfdrive.com/engineering-thermofluids-thermodynamics-fluid-mechanicsand-heat-transfer-d165003581.html>
- Dixon, S. L. (Sydney Lawrence). (2005). Fluid mechanics and thermodynamics of turbomachinery. Amsterdam: Elsevier. <https://www.pdfdrive.com/fluid-mechanicsthermodynamics-of-turbomachinery-d33423382.html>

### ➤ FREE E-JOURNALS

- Open Access Thermodynamics Journals. <https://www.openaccessjournals.com/peer-reviewed-articles/open-access-thermodynamics-journals-1179.html>
- The Open Thermodynamics Journal. <https://benthamopen.com/TOTHERJ/home/>
- International Journal of Thermodynamics. <https://dergipark.org.tr/en/pub/ijot>
- Entropy. [https://www.mdpi.com/journal/entropy/special\\_issues/Thermodynamic\\_Engineering](https://www.mdpi.com/journal/entropy/special_issues/Thermodynamic_Engineering)
- Thermodynamics. <https://www.mdpi.com/journal/entropy/sections/thermodynamics>
- Journal of Thermodynamics. <https://www.hindawi.com/journals/jther/>
- Open Access of Thermodynamics Journal. <https://www.omicsonline.org/thermodynamics/open-access-journals.php>
- International Journal of Thermodynamics & Catalysis. [https://www.gavinpublishers.com/journals/journals\\_details/International-Journal-ofThermodynamics-and-Catalysis](https://www.gavinpublishers.com/journals/journals_details/International-Journal-ofThermodynamics-and-Catalysis)

### ➤ FREE E-THESES

- Nelson, S. R. (2011). Effect of Participant Gender, Professor Gender, and Activity Interventions on the Understanding of Concepts in Thermodynamics. (Thesis). Bucknell University. Retrieved from [https://digitalcommons.bucknell.edu/masters\\_theses/42](https://digitalcommons.bucknell.edu/masters_theses/42)
- Lostaglio, M. (2016). The resource theory of quantum thermodynamics. (Doctoral Dissertation). Imperial College London. Retrieved from <https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.702811>
- Hansen, D. (2017). Horizon Thermodynamics from Einstein's Equation of State. (Thesis). University of Waterloo. Retrieved from <http://hdl.handle.net/10012/11826>
- Fox, C. D. L. (2018). Modeling Simplified Reaction Mechanisms using Continuous Thermodynamics for Hydrocarbon Fuels. (Thesis). University of Ottawa. Retrieved from <http://hdl.handle.net/10393/37554>
- Bae, J. (2019). Development of New Methods for Studying DNA Thermodynamics and Structures. (Doctoral Dissertation). Rice University. Retrieved from <http://hdl.handle.net/1911/105414>
- Misin, M. (2016). Can approximate integral equation theories accurately predict solvation thermodynamics. (Doctoral Dissertation). University of Strathclyde. Retrieved from <http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.707282>
- Miao, B. (2019). Calculating Thermodynamic Probability and Fluctuation with Free Energy. (Thesis). Figshare. Retrieved from <http://hdl.handle.net/10.6084/m9.figshare.8266736.v1>
- M, S. p. (2014). Thermodynamical analysis of free and forced convection flows with uniform suction and injection;. (Thesis). Anna University. Retrieved from <http://shodhganga.inflibnet.ac.in/handle/10603/27299>
- Lapolla, A. (2015). Symmetries in thermodynamics and the conundrum of negative temperature. (Thesis). Università degli Studi di Padova. Retrieved from [http://tesi.cab.unipd.it/50122/1/Lapolla\\_Alessio.pdf](http://tesi.cab.unipd.it/50122/1/Lapolla_Alessio.pdf)
- Sabourin, S. (2011). Auto-Ignition of Liquid n-Paraffin Fuels Mixtures as Single Droplets Using Continuous Thermodynamics . (Thesis). University of Ottawa. Retrieved from <http://hdl.handle.net/10393/20135>
- Hollas, D. (2017). Simulations of Nuclear Quantum Effects in Thermodynamics and Spectroscopy. (Thesis). Figshare. Retrieved from <http://hdl.handle.net/10.6084/m9.figshare.4774534.v2>
- Lim., M. (2021). Thermodynamic assessment of the Al-Cu-Mg-Ag quaternary system. (Thesis). Monash University. Retrieved from <https://doi.org/10.26180/14969190.v1>
- Khosla, M. P. (2021). Thermodynamic properties of fluids. (Thesis). Monash University. Retrieved from <https://doi.org/10.26180/14968272.v1>
- Prunkl, C. (2018). The scope of thermodynamics. (Doctoral Dissertation). University of Oxford. Retrieved from <https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.780600>
- Scandolo, C. M. (2014). Entanglement and thermodynamics in general probabilistic theories. (Thesis). Università degli Studi di Padova. Retrieved from [http://tesi.cab.unipd.it/46015/1/Scandolo\\_carlo\\_maria.pdf](http://tesi.cab.unipd.it/46015/1/Scandolo_carlo_maria.pdf)
- Dawborne, M. A. (2014). Explaining Low Entropy: An Examination of the Efficacy of Cosmological Explanations for the Second Law of Thermodynamics. (Master's Thesis). Columbia University. Retrieved from <https://doi.org/10.7916/D8057FWF>

- Scandolo, C. M. (2018). Information-theoretic foundations of thermodynamics in general probabilistic theories. (Doctoral Dissertation). University of Oxford. Retrieved from <https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.770421>
- Gerogiokas, G. (2015). Quantitative models of biomolecular hydration thermodynamics. (Doctoral Dissertation). University of Edinburgh. Retrieved from <http://hdl.handle.net/1842/14181>

### C. PROFESSIONAL ORGANIZATIONS

- American Association for Clinical Chemistry (AACC). <https://www.aacc.org/>
- American Society for Biochemistry and Molecular Biology (ASBMB). <https://www.asbmb.org/>
- Biochemical Society. <https://www.biochemistry.org/>
- Chemical Institute of Canada. <https://www.cheminst.ca/>
- Federation of Asian Chemical Societies (FACS). <http://www.facs-as.org/>
- World Association of Theoretical and Computational Chemists. <http://watoc.net/>
- American Chemical Society. <https://www.acs.org/content/acs/en.html>
- World Association of Theoretical and Computational Chemist. <http://watoc.net/>
- Society of Toxicology and Chemistry. <https://www.setac.org/>
- International Society for the Philosophy of Chemistry. <https://sites.google.com/site/socphilchem/>
- Federations of European Materials Societies. <https://www.fems.org/index.php>

### D. OTHER RELATED WEB PORTALS

- Nature Portfolio. <https://www.nature.com/subjects/thermodynamics>
- Britannica. <https://www.britannica.com/science/thermodynamics>
- NIST. <https://www.nist.gov/thermodynamics-0>
- Learn Thermo. <https://www.learnthermo.com/testimonials.php>
- MIT. <https://web.mit.edu/16.unified/www/FALL/thermodynamics/>
- Science Daily. [https://www.sciencedaily.com/news/matter\\_energy/thermodynamics/](https://www.sciencedaily.com/news/matter_energy/thermodynamics/)
- Encyclopedia of Human Thermodynamics. <http://www.eoht.info/page/Thermodynamics+websites>
- Khan Academy. <https://www.khanacademy.org/science/physics/thermodynamics>
- Learn Thermo. <https://www.learnthermo.com/>
- MIT. <https://web.mit.edu/16.unified/www/FALL/thermodynamics/>
- NIST. <https://www.nist.gov/topics/thermodynamics>

### E. RELATED RESEARCH GUIDES

- University of Arkansas. <https://uark.libguides.com/c.php?g=658860&p=4626892>
- Case Western University. <https://researchguides.case.edu/c.php?g=17536&p=98878>
- University of Houston Libraries. <https://guides.lib.uh.edu/mechanical>
- University of Akron. <https://libguides.uakron.edu/?b=g&d=a>

## IV. TUTORIALS

- First Law of Thermodynamics, Basic Introduction, Physics Problems. <https://www.youtube.com/watch?v=7Siv2NNCFag>
- First Law of Thermodynamics, Basic Introduction - Internal Energy, Heat and Work – Chemistry. <https://www.youtube.com/watch?v=NyOYW07-L5g>
- 1st Law of Thermodynamics. <https://www.youtube.com/watch?v=f4Qzpg-0cs0>
- Thermodynamics Introduction. [https://www.youtube.com/watch?v=a6tz3-FDh\\_I](https://www.youtube.com/watch?v=a6tz3-FDh_I)
- Zeroth Law of Thermodynamics. <https://www.youtube.com/watch?v=10LJ1yqRx6U>
- Thermodynamics Process – Isothermal. <https://www.youtube.com/watch?v=F-sOMdfnvxE>
- Thermodynamics, PV Diagrams, Internal Energy, Heat, Work, Isothermal, Adiabatic, Isobaric, Physics. <https://www.youtube.com/watch?v=TnDCxw0y6YM>
- First Law of Thermodynamics. <https://www.youtube.com/watch?v=C6VVk7Imosw>
- Second Law Thermodynamics. <https://www.youtube.com/watch?v=D9KvIT47csY>
- Learn Thermo. <https://www.learnthermo.com/tutorials.php>
- WIS IQ. <https://www.wiziq.com/tutorials/thermodynamics>
- Tutorials Point. [https://www.tutorialspoint.com/thermodynamics\\_and\\_power\\_plant/index.asp](https://www.tutorialspoint.com/thermodynamics_and_power_plant/index.asp)

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