

Short Syllabus of Chemical Engineering (130) Curriculum

MA1122, Calculus I (4 SKS)

Short Syllabus

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Related Courses

1. MA1123 Elementary Calculus I, Prohibited.

Bibliography

1. Purcell, E.J. dan D. Varberg (Alih bhs: I Susila), 2003, Kalkulus dan Geometri Analitik Jilid 1 dan 2, Erlangga
2. Purcell, E.J. and D. Varberg, 2000, Calculus with Analytic Geometry, 8 Edition, Prentice Hall
3. Stewart, J. (Alih bhs: I N. Susila; H. Gunawan), 2000, Kalkulus Jilid 1 dan 2, Erlangga

MA1222, Calculus II (4 SKS)

Short Syllabus

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Related Courses

1. MA1122 Calculus I, Prerequisites.
2. MA1223 Elementary Calculus II, Prohibited.

Bibliography

1. Purcell, E.J. dan D. Varberg (Alih bhs: I Susila), 2003, Kalkulus dan Geometri Analitik Jilid 1 dan 2, Erlangga
2. Purcell, E.J. and D. Varberg, 2000, Calculus with Analytic Geometry, 8 Edition, Prentice Hall
3. Stewart, J. (Alih bhs: I N. Susila; H. Gunawan), 2000, Kalkulus Jilid 1 dan 2, Erlangga

BI1001, Environmental Science (2 SKS)

Short Syllabus

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Related Courses

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Bibliography

1. Cunningham, W.P. & B.W. Saigo, 1999, Environmental science: a global concern, 5 Edition, McGraw-Hill, Boston
2. Miller, G. Tyler, Jr, 2002, Living in the environment: Principles, connections, and solutions., Brooks/Cole Publishing Company, Pacific Grove, CA
3. Kupchella, C.E. & M.C. Hyland, 1993, Environmental science: living within the system of nature., Prentice-Hall International, New Jersey

FI1101, Elementary Physics IA (4 SKS)

Short Syllabus

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Related Courses

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Bibliography

1. Serway, R.A., 1996, Physics for Scientists and Engineers with Modern Physics, Saunders College Publishing
2. Halliday, D. et. al., 2001, Fundamentals of Physics, John Wiley & Sons
3. Fishbane, P. M, 1996, Physics for Scientists and Engineers, Prentice Hall

KI1111, Basic Chemistry I A (3 SKS)

Short Syllabus

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Related Courses

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Bibliography

1. Chang, R., 2000, Essential Chemistry, 2nd Edition, McGraw Hill, New York
2. Brady J.E., and J. Holum R., 1996, Chemistry, the study of Matter and its changes., 2nd Edition, John Wiley, New York
3. Achmad, H., 1992, Seri Penuntun Belajar Kimia Dasar, Citra Aditya Bakti, Bandung

FI1201, Elementary Physics IIA (4 SKS)

Short Syllabus

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Related Courses

1. FI1101 Elementary Physics IA, Prerequisited.

Bibliography

1. Serway, R.A., 1996, Physics for Scientists and Engineers with Modern Physics,

Saunders College Publishing

2. Halliday, D. et. al., 2001, Fundamentals of Physics, John Wiley & Sons

3. Fishbane, P.M., 1996, Physics for Scientist and Engineers, Prentice Hall

KI1211, Basic Chemistry II A (3 SKS)

Short Syllabus

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Related Courses

1. KI1111 Basic Chemistry I A, Prerequisites.

Bibliography

1. Chang, R., 2000, Essential Chemistry, 2nd Edition, McGraw Hill, New York

2. Brady J.E., and J. Holum R., 1996, Chemistry, the study of Matter and its changes., 2nd Edition, John Wiley, New York

3. Achmad H. dan E. Ratnaningsih, Kimia Organik, Ilmu Kimia dan Ilmu Kimia Lingkungan, Koordinator Kimia TPB, Jurusan Kimia FMIPA, ITB

KI2051, Organic Chemistry (4 SKS)

Short Syllabus

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Related Courses

1. KI1111 Basic Chemistry I A, Prerequisites.

2. KI1211 Basic Chemistry II A, Prerequisites.

Bibliography

1. Fessenden, R.J., and J.S. Fessenden, 1994, Organic Chemistry, 5th Edition, Willard Grant Press, Boston

2. Volhardt, K.P.C., and N. Schore, 1999, Organic Chemistry: Structure and Function, 3rd Edition, W.H. Freeman and Company, New York, 1

KI2051, Organic Chemistry (4 SKS)

Short Syllabus

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Related Courses

1. KI1111 Basic Chemistry I A, Prerequisites.

2. KI1211 Basic Chemistry II A, Prerequisites.

Bibliography

1. Fessenden, R.J., and J.S. Fessenden, 1994, Organic Chemistry, 5th Edition, Willard Grant Press, Boston
2. Volhardt, K.P.C., and N. Schore, 1999, Organic Chemistry: Structure and Function, 3rd Edition, W.H. Freeman and Company, New York, 1

KI2051, Organic Chemistry (4 SKS)**Short Syllabus**

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Related Courses

1. KI1111 Basic Chemistry I A, Prerequisites.
2. KI1211 Basic Chemistry II A, Prerequisites.

Bibliography

1. Fessenden, R.J., and J.S. Fessenden, 1994, Organic Chemistry, 5th Edition, Willard Grant Press, Boston
2. Volhardt, K.P.C., and N. Schore, 1999, Organic Chemistry: Structure and Function, 3rd Edition, W.H. Freeman and Company, New York, 1

KI2122, Analytical Chemistry (4 SKS)**Short Syllabus**

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Related Courses

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Bibliography

1. Skoog, D. A.; D. M. West and F. J. Holler, 1996, Fundamentals of Analytical Chemistry, 7th Edition, Sauder College Publisher
2. Day R. A. and A.L. Underwood, 1991, Quantitative Analysis, 6th Edition, Prentice Hall International

KI2122, Analytical Chemistry (4 SKS)**Short Syllabus**

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Related Courses

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Bibliography

1. Skoog, D. A.; D. M. West and F. J. Holler, 1996, Fundamentals of Analytical

Chemistry, 7th Edition, Sauder College Publisher
2. Day R. A. and A.L. Underwood, 1991, Quantitative Analysis, 6th Edition, Prentice Hall International

KI2122, Analytical Chemistry (4 SKS)

Short Syllabus

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Related Courses

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Bibliography

1. Skoog, D. A.; D. M. West and F. J. Holler, 1996, Fundamentals of Analytical Chemistry, 7th Edition, Sauder College Publisher
2. Day R. A. and A.L. Underwood, 1991, Quantitative Analysis, 6th Edition, Prentice Hall International

KI2242, Physical Chemistry of Solution and Colloids (2 SKS)

Short Syllabus

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Related Courses

1. KI1111 Basic Chemistry I A, Prerequisites.
2. KI1211 Basic Chemistry II A, Prerequisites.

Bibliography

1. Atkins P. and J. Paula, 2002, Physical Chemistry, 7th Edition, Oxford University, Oxford
2. Barrow, G.M., 1996, Physical Chemistry, 6th Edition, McGraw-Hill, Singapore

TK10T1, Concepts of Technology (2 SKS)

Short Syllabus

This course dealing with technologies and important factors which are related to them. Topics cover : The role of science, technology and arts in the development of nations and humanity; concepts of science, technology and arts and their implementation at ITB.

Related Courses

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Bibliography

1. Koordinator Mata Kuliah, 1996, Buku Bahan Kuliah Konsep Teknologi, TPB-ITB, Bandung

2. Sasmojo, S., et.al., 1990, Menerawang Masa Depan Ilmu, Teknik dan Seni dalam Budaya Masyarakat Bangsa Indonesia, ITB, Bandung

TK1101, Introduction to Chemical Industries (2 SKS)

Short Syllabus

This course dealing with chemical industries. Topics cover : A general introduction to the world of industry and more specifically to those industries involving chemical processes; chemical process definition and its applications on an industrial scale; introduction to natural or primary raw materials and their potential use; introduction to the use of chemical agents in industry.

Related Courses

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Bibliography

1. Tatang H. Soerawidjaja, 2003, Diktat Kuliah Pengenalan Industri Kimia, 1. Tatang H. Soerawidjaja, Diktat Kuliah Pengenalan Industr, Departemen Teknik Kimia ITB,Bandung
2. Eveleth, W.T. (ed.), 1990, Kline Guide to the U.S. Chemical Industry, 5 Edition, Kline & Company, Inc., Fairfield, N.J.
3. Killeffer, D.H., 1967, Chemical Engineering , Doubleday & Company, Inc., New York

TK1201, Introduction to Chem Engineering (2 SKS)

Short Syllabus

This course dealing with fundamentals of chemical engineering. Topics cover : Scope of Chemical Engineering as a career and as an engineering science; units and dimensions; formulation and solution of chemical engineering science problems; basic material and energy calculations; spreadsheets; material and fluid flows; mass transfer and stagewise operations; chemical reaction engineering; energy supply and energy utilization; construction materials; chemical process control; economic evaluations; safety and environmental issues: case studies.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.

Bibliography

1. Tatang H. Soerawidjaja, 2003, Diktat Kuliah Pengenalan Teknik Kimia, Departemen Teknik Kimia ITB, Bandung
2. Solen, K. dan J.N. Harb, 1998, Introduction to Chemical Processes: Fundamentals & Design, 3 Edition, McGraw-Hill, New York
3. Brian, P.L.T., 1972, Staged Cascades in Chemical Processing, Prentice-Hall, Englewood Cliffs, N.J

TK2101, Chemical Engineering Mathematics (2 SKS)

Short Syllabus

This course dealing with mathematics analysis in chemical engineering. Topics cover : Simple process modelling; first order ordinary differential equations; second order ordinary differential equations; higher order linear ordinary differential equations; simultaneous solution of ordinary differential equations; series; Laplace transform; partial differential equations.

Related Courses

1. MA1222 Calculus II, Prerequisites.

Bibliography

1. Rice, R.G. and D.D. Do, 1995, Applied Mathematics and Modeling for Chemical Engineers, John Wiley & Sons, New York
2. Jenson, V.G. and Jeffreys, G.V., 1977, Mathematical Methods in Chemical Engineering, Academic Press, London
3. Mickley, H.S., Shewrwood, T.S., and Reed, C.E., 1957, Applied Mathematics in Chemical Engineering, McGraw-Hill, New York

TK2102, Process Computation (3 SKS)

Short Syllabus

This course dealing with problems solving calculations by using computer. Topics cover : Review of computer systems; approximation and error; matrices and vectors; solution of one dimensional non-linear equations; solution of linear equations and non-linear equations; one dimensional and multi-variable optimization; numerical integration of differential equations.

Related Courses

1. KI1211 Basic Chemistry II A, Prerequisites.
2. MA1222 Calculus II, Prerequisites.

Bibliography

1. Riggs, J. B., 1998, An Introduction to Numerical Methods for Chemical Engineers, Texas Tech University Press, Lubbock, Texas
2. Hanna, O.T. and O.C. Sandal, 1997, Computation Methods in Chemical Engineering, Prenti-Hall, Englewood Cliff, New Jersey
3. Constantinides, A., 1989, Applied Numerical Methods with Personal Computers, McGraw Hill, New York

TK2103, Chem Engineering Thermodynamics I (2 SKS)

Short Syllabus

This course dealing with thermodynamics systems in chemical engineering. Topics cover : Definition of system, units, fundamentals of equations of state: ideal gas, virial and cubic equations; First Law of Thermodynamics: energy balance, definition of internal energy, heat, work, enthalpy and heat capacity. Ideal gas energy balance: closed and open system, isothermal, isobaric, isometric and adiabatic processes. Second Law of Thermodynamics: Carnot cycle, entropy, process spontaneity criteria. Entropy change of ideal gases: isothermal, isobaric, isometric, adiabatic and mixing processes. Free energy: Gibbs and Helmholtz, lost work and exergy. Properties of real fluids: calculation of ΔU , ΔH and ΔS using thermodynamic diagrams and tables, introduction to calculations using equations of state. Estimation of density, relation between saturated vapour pressure and boiling point, variables at critical condition. Ideal gas flow systems: expansion, compression and throttling. Thermodynamic cycles: Otto, Diesel, Brayton, Rankine, refrigeration, and liquefaction.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. KI1211 Basic Chemistry II A, Prerequisites.
3. MA1222 Calculus II, Prerequisites.

Bibliography

1. Smith, J.M., H.C. van Ness and M.C. Abbott, 1996, Introduction to Chemical Engineering Thermodynamic, 5 Edition, McGraw-Hill Book Co., Inc., New York
2. Daubert, T.E., 1985, Chemical Engineering Thermodynamics, McGraw-Hill Book Co., Inc., New York
3. Sandler, S.I., 1989, Chemical and Engineering Thermodynamics, 2 Edition, John Wiley & Sons, New York

TK2104, Industrial Microbiology (2 SKS)

Short Syllabus

This course dealing with fundamentals of microbiology. Topics cover : Definition, scope and roles of microbiology and its relation to other disciplines. Fundamentals and characteristics of the roles of microbes in bioprocess technology; nomenclature and classification of microbes; review of microbes commonly used in bioprocess industries: bacteria, actinomycetes, yeasts, fungi, viruses and algae; microbial growth: types, measurement, interpretation, factors affecting the growth; prokaryotic and eukaryotic microbe cell structure; isolation of microbial pure culture.

Related Courses

1. BI1001 Environmental Science, Prerequisites.
2. KI1111 Basic Chemistry I A, Prerequisites.

Bibliography

1. Stainer, R.Y., J.L. Ingraham, M.L. Wheelis and P.R., 1986, The Microbial World, 5th ed., Prentice-Hall, Inc., Englewood Cliffs, New Jersey
2. Frobisher, M.F., R.D. Hinsdill, K.T. Crabtree and, 1974, Fundamentals of Microbiology, 9 Edition, W.B. Saunders Company., Philadelphia-London-Toront
3. Krueger, R.G., N.W. Gillham and J.H. Coggin, Jr., 1973, Introduction to Microbiology, The McMillan Co., New York

TK2101, Chemical Engineering Mathematics (2 SKS)

Short Syllabus

This course dealing with mathematics analysis in chemical engineering. Topics cover : Simple process modelling; first order ordinary differential equations; second order ordinary differential equations; higher order linear ordinary differential equations; simultaneous solution of ordinary differential equations; series; Laplace transform; partial differential equations.

Related Courses

1. MA1222 Calculus II, Prerequisites.

Bibliography

1. Rice, R.G. and D.D. Do, 1995, Applied Mathematics and Modeling for Chemical Engineers, John Wiley & Sons, New York
2. Jenson, V.G. and Jeffreys, G.V., 1977, Mathematical Methods in Chemical Engineering, Academic Press, London
3. Mickley, H.S., Shewrwood, T.S., and Reed, C.E., 1957, Applied Mathematics in Chemical Engineering, McGraw-Hill, New York

TK2103, Chem Engineering Thermodynamics I (2 SKS)

Short Syllabus

This course dealing with thermodynamics systems in chemical engineering. Topics cover : Definition of system, units, fundamentals of equations of state: ideal gas, virial and cubic equations; First Law of Thermodynamics: energy balance, definition of internal energy, heat, work, enthalpy and heat capacity. Ideal gas energy balance: closed and open system, isothermal, isobaric, isometric and adiabatic processes. Second Law of Thermodynamics: Carnot cycle, entropy, process spontaneity criteria. Entropy change of ideal gases: isothermal, isobaric, isometric, adiabatic and mixing processes. Free energy: Gibbs and Helmholtz, lost work and exergy. Properties of real fluids: calculation of ΔU , ΔH and ΔS using thermodynamic diagrams and tables, introduction to calculations using equations of state. Estimation of density, relation between saturated vapour pressure and boiling point, variables at critical condition. Ideal gas flow systems: expansion, compression and throttling. Thermodynamic cycles: Otto, Diesel, Brayton, Rankine, refrigeration, and liquefaction.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. KI1211 Basic Chemistry II A, Prerequisites.
3. MA1222 Calculus II, Prerequisites.

Bibliography

1. Smith, J.M., H.C. van Ness and M.C. Abbott, 1996, Introduction to Chemical Engineering Thermodynamic, 5 Edition, McGraw-Hill Book Co., Inc., New York
2. Daubert, T.E., 1985, Chemical Engineering Thermodynamics, McGraw-Hill Book Co., Inc., New York
3. Sandler, S.I., 1989, Chemical and Engineering Thermodynamics, 2 Edition, John Wiley & Sons, New York

TK2104, Industrial Microbiology (2 SKS)

Short Syllabus

This course dealing with fundamentals of microbiology. Topics cover : Definition, scope and roles of microbiology and its relation to other disciplines. Fundamentals and characteristics of the roles of microbes in bioprocess technology; nomenclature and classification of microbes; review of microbes commonly used in bioprocess industries: bacteria, actinomycetes, yeasts, fungi, viruses and algae; microbial growth: types, measurement, interpretation, factors affecting the growth; prokaryotic and eukaryotic microbe cell structure; isolation of microbial pure culture.

Related Courses

1. BI1001 Environmental Science, Prerequisites.
2. KI1111 Basic Chemistry I A, Prerequisites.

Bibliography

1. Stainer, R.Y., J.L. Ingraham, M.L. Wheelis and P.R., 1986, The Microbial World, 5th ed., Prentice-Hall, Inc., Englewood Cliffs, New Jersey
2. Frobisher, M.F., R.D. Hinsdill, K.T. Crabtree and, 1974, Fundamentals of Microbiology, 9 Edition, W.B. Saunders Company., Philadelphia-London-Toront
3. Krueger, R.G., N.W. Gillham and J.H. Coggin, Jr., 1973, Introduction to Microbiology, The McMillan Co., New York

TK2101, Chemical Engineering Mathematics (2 SKS)

Short Syllabus

This course dealing with mathematics analysis in chemical engineering. Topics cover : Simple process modelling; first order ordinary differential equations; second order ordinary differential equations; higher order linear ordinary differential equations; simultaneous solution of ordinary differential equations; series; Laplace transform; partial differential equations.

Related Courses

1. MA1222 Calculus II, Prerequisites.

Bibliography

1. Rice, R.G. and D.D. Do, 1995, Applied Mathematics and Modeling for Chemical Engineers, John Wiley & Sons, New York
2. Jenson, V.G. and Jeffreys, G.V., 1977, Mathematical Methods in Chemical Engineering, Academic Press, London
3. Mickley, H.S., Shewrwood, T.S., and Reed, C.E., 1957, Applied Mathematics in Chemical Engineering, McGraw-Hill, New York

TK2102, Process Computation (3 SKS)

Short Syllabus

This course dealing with problems solving calculations by using computer. Topics cover : Review of computer systems; approximation and error; matrices and vectors; solution of one dimensional non-linear equations; solution of linear equations and non-linear equations; one dimensional and multi-variable optimization; numerical integration of differential equations.

Related Courses

1. KI1211 Basic Chemistry II A, Prerequisites.
2. MA1222 Calculus II, Prerequisites.

Bibliography

1. Riggs, J. B., 1998, An Intoduction to Numerical Methods for Chemical Engineers, Texas Tech University Press, Lubbock, Texas
2. Hanna, O.T. and O.C. Sandal, 1997, Computation Methods in Chemical Engineering, Prenti-Hall, Englewood Cliff, New Jersey
3. Constantinides, A., 1989, Applied Numerical Methods with Persoanl Computers, McGraw Hill, New York

TK2102, Process Computation (3 SKS)

Short Syllabus

This course dealing with problems solving calculations by using computer. Topics cover : Review of computer systems; approximation and error; matrices and vectors; solution of one dimensional non-linear equations; solution of linear equations and non-linear equations; one dimensional and multi-variable optimization; numerical integration of differential equations.

Related Courses

1. KI1211 Basic Chemistry II A, Prerequisites.
2. MA1222 Calculus II, Prerequisites.

Bibliography

1. Riggs, J. B., 1998, An Introduction to Numerical Methods for Chemical Engineers, Texas Tech University Press, Lubbock, Texas
2. Hanna, O.T. and O.C. Sandal, 1997, Computation Methods in Chemical Engineering, Prenti-Hall, Englewood Cliff, New Jersey
3. Constantinides, A., 1989, Applied Numerical Methods with Personal Computers, McGraw Hill, New York

TK2103, Chem Engineering Thermodynamics I (3 SKS)

Short Syllabus

This course dealing with thermodynamics systems in chemical engineering. Topics cover : Definition of system, units, fundamentals of equations of state: ideal gas, virial and cubic equations; First Law of Thermodynamics: energy balance, definition of internal energy, heat, work, enthalpy and heat capacity. Ideal gas energy balance: closed and open system, isothermal, isobaric, isometric and adiabatic processes. Second Law of Thermodynamics: Carnot cycle, entropy, process spontaneity criteria. Entropy change of ideal gases: isothermal, isobaric, isometric, adiabatic and mixing processes. Free energy: Gibbs and Helmholtz, lost work and exergy. Properties of real fluids: calculation of ΔU , ΔH and ΔS using thermodynamic diagrams and tables, introduction to calculations using equations of state. Estimation of density, relation between saturated vapour pressure and boiling point, variables at critical condition. Ideal gas flow systems: expansion, compression and throttling. Thermodynamic cycles: Otto, Diesel, Brayton, Rankine, refrigeration, and liquefaction.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. KI1211 Basic Chemistry II A, Prerequisites.
3. MA1222 Calculus II, Prerequisites.

Bibliography

1. Smith, J.M., H.C. van Ness and M.C. Abbott, 1996, Introduction to Chemical Engineering Thermodynamic, 5 Edition, McGraw-Hill Book Co., Inc., New York
2. Daubert, T.E., 1985, Chemical Engineering Thermodynamics, McGraw-Hill Book Co., Inc., New York
3. Sandler, S.I., 1989, Chemical and Engineering Thermodynamics, 2 Edition, John Wiley & Sons, New York

TK2104, Industrial Microbiology (2 SKS)

Short Syllabus

This course dealing with fundamentals of microbiology. Topics cover : Definition, scope and roles of microbiology and its relation to other disciplines. Fundamentals and

characteristics of the roles of microbes in bioprocess technology; nomenclature and classification of microbes; review of microbes commonly used in bioprocess industries: bacteria, actinomycetes, yeasts, fungi, viruses and algae; microbial growth: types, measurement, interpretation, factors affecting the growth; prokaryotic and eukaryotic microbe cell structure; isolation of microbial pure culture.

Related Courses

1. BI1001 Environmental Science, Prerequisites.
2. KI1111 Basic Chemistry I A, Prerequisites.

Bibliography

1. Stainer, R.Y., J.L. Ingraham, M.L. Wheelis and P.R., 1986, The Microbial World, 5th ed., Prentice-Hall, Inc., Englewood Cliffs, New Jersey
2. Frobisher, M.F., R.D. Hinsdill, K.T. Crabtree and, 1974, Fundamentals of Microbiology, 9 Edition, W.B. Saunders Company., Philadelphia-London-Toront
3. Krueger, R.G., N.W. Gillham and J.H. Coggin, Jr., 1973, Introduction to Microbiology, The McMillan Co., New York

TK2202, Mass and Energy Balances (3 SKS)

Short Syllabus

This course dealing with mass and energy balance calculations. Topics cover : Process system mass balance analysis; Solution methods using elemental, species or inert material balance; Mass balance calculations for systems with purge, recycle, bypass, chemical reactions, and physical separations; Energy balance calculations based on process systems mass balance; energy changes in chemical processes, phase change, mixing, combustion, evaporation, humidification, drying.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.
5. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Reklaitis, G.V., 1983, Introduction to Material and Energy Balance , John Wiley & Sons, New York
2. Himmelblau, D.M., 1989, Basic Principles and Calculations in Chemical Engineering , Prentice-Hall, Englewood Cliff, New Jersey
3. Felder, R.M. and R.W. Rousseau, 1986, Elementary Principles of Chemical Processes, John Wiley & Sons, New York

TK2203, Chem Engineering Thermodynamics II (2 SKS)

Short Syllabus

This course dealing with comprehensive thermodynamics principles. Topics cover : Solution properties: partial molar quantities, fugacity and activity; phase equilibrium criteria; ideal and nonideal vapour-liquid equilibrium; Calculation of activity and fugacity coefficients: K-values; Equilibrium phase envelope for single and multicomponent vapour-liquid systems: definitions of critical point, cricondenterm, cricondenbar, retrograde condensation and convergence pressure; Phase equilibrium calculations; Chemical reaction equilibrium criteria; Degree of reaction continuity; Chemical reaction equilibrium constant calculation, influence of temperature and pressure; Homogeneous and heterogeneous reaction equilibria; Homogeneous multiple reaction equilibria: concept of free energy minimization.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Smith, J.M., H.C. van Ness and M.C. Abbott, 1996, Introduction to Chemical Engineering Thermodynamic, 5 Edition, McGraw-Hill Book Co., Inc., New York
2. Daubert, T.E., 1985, Chemical Engineering Thermodynamics, McGraw-Hill Book Co., Inc., New York
3. Sandler, S.I., 1989, Chemical and Engineering Thermodynamics, 2 Edition, John Wiley & Sons, New York

TK2204, Chem Reaction Kinetic and Catalysis (3 SKS)

Short Syllabus

This course dealing with chemical reactions kinetics and basic principles of catalyst. Topics cover : simple consecutive/parallel reactions; Determination of homogeneous reaction rate: kinetic data collection and interpretation techniques; Derivation of reaction rate equation from reaction mechanism; Chemical kinetics theory; Introduction to catalysis; homogeneous catalytic reaction kinetics; Heterogeneous catalytic reaction kinetics.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.
5. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Hill, C.G, 1977, An Introduction to Chemical Engineering Kinetics and Design, John Wiley & Sons, New York
2. Smith,J.M., 1970, Chemical Engineering Kinetics, 2 Edition, McGraw-Hill Book Co., Inc., New York
3. Laidler,K.C., 1986, Chemical Engineering Kinetics, Tata McGraw-Hill Publishing Co., New Delhi

TK2205, Particle and Fluid Mechanics (3 SKS)

Short Syllabus

Fluids, fluid statics and fluid flow; fundamentals of momentum transport and its applications; Fluid flow in pipes; Fluid flow measurement; Fluid pumping; Gas-liquid multiphase flow; Fluid flow through solid particles: settling, packed bed, fluidisation; Mechanical separations: sedimentation, filtration; Introduction to transient flow.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.
5. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Geankoplis, C.J., 1993, Transport Process and Unit Operations, 3 Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jersey
2. Holland, F.A. and R. Bragg, 1995, Fluid Flow for Chemical Engineers, 2 Edition, Edward Arnold, London
3. McCabe, W.L., J.C.Smith and P. Harriott, 1993, Unit Operations of Chemical Engineering, 5 Edition, McGraw-Hill Book Co.,Inc., New York

TK2206, Utility System I (2 SKS)

Short Syllabus

This course dealing with various of utilizations and all matters that related to them. Topics cover : Water sources and qualities; fundamentals of water treatment; industrial/process water, demineralized water, portable water, boiler feedwater, cooling water; desalination systems; Fuels: solid, liquid, and gaseous fuels; Combustion and furnaces; Boilers and steam systems; Compressed air system, instrument air, inert gas; heat transfer medium; refrigeration.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Perry, R.H. and D.W. Green (ed), 1983, Perry's Chemical Engineer's Handbook, 6 Edition, McGraw Hill Book Co., Inc., New York
2. Broughton, J. (ed), 1994, Process Utility System: Introduction to Design, Operation and Maintenance, Institution of Chemical Engineers, Rugby, U.K
3. Sitompul, Darwin (editor penerjemah), 1989, Prinsip-prinsip Konversi Energi, (terjemah dari Principles of Energy Conversion karya Archie W. Culp, Erlangga, Jakarta)

TK2201, Measurement and Data Interpretation (2 SKS)

Short Syllabus

This course dealing with instrumental systems of measurement. Topics cover : Role of experiments in engineering and technology; Data collection and interpretation requirements; Measurement quality; Characteristics of instruments; Survey of instruments and measurement methods for temperature, pressure, flow rate, liquid level, vapour pressure, density, electrical conductivity, etc.; Graphical and numerical data processing; Variable-screening techniques, factorial design, introduction to experimental design for mechanistic model parameter estimation.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. TK1101 Introduction to Chemical Industries, Prerequisites.
3. TK1201 Introduction to Chem Engineering, Prerequisites.

Bibliography

1. Ray, M.S., 1988, Engineering Experimentation: Ideas, Techniques, Presentation, McGraw Hill Book Co., Inc., New York
2. Gibbings, J.C., 1986, The Systematic Experiment, Cambridge University Press, Cambridge, U.K

TK2207, Fundamental of Bioprocess (3 SKS)

Short Syllabus

This course dealing with fundamentals of bioprocess science. Topics cover : Definition and scope of bioprocesses; types and properties of biocatalysts; Biocatalytic growth and activity; Factors influencing biocatalytic growth and activity; strain purification techniques; Bioprocess operations: starter development, various bioprocess operations; Biomass/biocatalyst and product growth kinetics; Process control techniques; Sterilization and aseptic; Basic bioprocess laboratory work.

Related Courses

1. TK2104 Industrial Microbiology, Prerequisites.

Bibliography

1. Stainer, R.Y., J.L. Ingraham, M.L. Wheelis and P.R., 1986, *The Microbial World*, 5th ed., Prentice-Hall, Inc., Englewood Cliffs, New Jersey
2. Aiba S., A.E. Humphrey and N.F. Millis, 1973, *Biochemical Engineering*, 2 Edition, University of Tokyo Press., Tokyo
3. Moo Young, M. (ed), 1985, *Comprehensive Biotechnology*, Vol.I, Pergamon Press, Oxford, UK

TK2208, Basics of Food Technology (3 SKS)

Short Syllabus

This course dealing with food technology introduction. Topics cover : Food as a basic need and economic commodity; Food components: carbohydrates, lipids, proteins, minerals, water, vitamins and pigments. Primary food chemistry: cereals and breads, milk and dairy products, meat products, eggs, oils and fats, vegetable and single-cell protein, food additives; Food processing, food industry characteristics.

Related Courses

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Bibliography

1. , 1977, "Food", "Food Chain", dan "Food Engineering", hal. 406 – 443 di dalam McGraw-Hill Ency, McGraw-Hill Book Co., New York
2. Alois, C. dan Linden, G., 1991, *Food Biochemistry*, Ellis Horwood Ltd., Chiches-ter, U.K
3. Potter, N.N., dan Hotchkiss, J.H., 1995, *Food Science*, 5 Edition, Chapman & Hall, New York

TK2202, Mass and Energy Balances (3 SKS)

Short Syllabus

This course dealing with mass and energy balance calculations. Topics cover : Process system mass balance analysis; Solution methods using elemental, species or inert material balance; Mass balance calculations for systems with purge, recycle, bypass, chemical reactions, and physical separations; Energy balance calculations based on process systems mass balance; energy changes in chemical processes, phase change, mixing, combustion, evaporation, humidification, drying.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.
5. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Reklaitis, G.V., 1983, Introduction to Material and Energy Balance, John Wiley & Sons, New York
2. Himmelblau, D.M., 1989, Basic Principles and Calculations in Chemical Engineering, Prentice-Hall, Englewood Cliff, New Jersey
3. Felder, R.M. and R.W. Rousseau, 1986, Elementary Principles of Chemical Processes, John Wiley & Sons, New York

TK2203, Chem Engineering Thermodynamics II (2 SKS)

Short Syllabus

This course dealing with comprehensive thermodynamics principles. Topics cover : Solution properties: partial molar quantities, fugacity and activity; phase equilibrium criteria; ideal and nonideal vapour-liquid equilibrium; Calculation of activity and fugacity coefficients: K-values; Equilibrium phase envelope for single and multicomponent vapour-liquid systems: definitions of critical point, cricondenterm, cricondenbar, retrograde condensation and convergence pressure; Phase equilibrium calculations; Chemical reaction equilibrium criteria; Degree of reaction continuity; Chemical reaction equilibrium constant calculation, influence of temperature and pressure; Homogeneous and heterogeneous reaction equilibria; Homogeneous multiple reaction equilibria: concept of free energy minimization.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Smith, J.M., H.C. van Ness and M.C. Abbott, 1996, Introduction to Chemical Engineering Thermodynamic, 5 Edition, McGraw-Hill Book Co., Inc., New York
2. Daubert, T.E., 1985, Chemical Engineering Thermodynamics, McGraw-Hill Book Co., Inc., New York
3. Sandler, S.I., 1989, Chemical and Engineering Thermodynamics, 2 Edition, John Wiley & Sons, New York

TK2204, Chem Reaction Kinetic and Catalysis (3 SKS)

Short Syllabus

This course dealing with chemical reactions kinetics and basic principles of catalyst. Topics cover : simple consecutive/parallel reactions; Determination of homogeneous reaction rate: kinetic data collection and interpretation techniques; Derivation of reaction rate equation from reaction mechanism; Chemical kinetics theory; Introduction to catalysis; homogeneous catalytic reaction kinetics; Heterogeneous catalytic reaction kinetics.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.
5. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Hill, C.G, 1977, An Introduction to Chemical Engineering Kinetics and Design, John Wiley & Sons, New York
2. Smith,J.M., 1970, Chemical Engineering Kinetics, 2 Edition, McGraw-Hill Book Co., Inc., New York
3. Laidler,K.C., 1986, Chemical Engineering Kinetics, Tata McGraw-Hill Publishing Co., New Delhi

TK2205, Particle and Fluid Mechanics (3 SKS)

Short Syllabus

Fluids, fluid statics and fluid flow; fundamentals of momentum transport and its applications; Fluid flow in pipes; Fluid flow measurement; Fluid pumping; Gas-liquid multiphase flow; Fluid flow through solid particles: settling, packed bed, fluidisation; Mechanical separations: sedimentation, filtration; Introduction to transient flow.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.
5. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Geankoplis, C.J., 1993, Transport Process and Unit Operations, 3 Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jersey
2. Holland, F.A. and R. Bragg, 1995, Fluid Flow for Chemical Engineers, 2 Edition, Edward Arnold, London
3. McCabe, W.L., J.C.Smith and P. Harriott, 1993, Unit Operations of Chemical Engineering, 5 Edition, McGraw-Hill Book Co.,Inc., New York

TK2206, Utility System I (2 SKS)

Short Syllabus

This course dealing with various of utilizations and all matters that related to them. Topics cover : Water sources and qualities; fundamentals of water treatment;

industrial/process water, demineralized water, portable water, boiler feedwater, cooling water; desalination systems; Fuels: solid, liquid, and gaseous fuels; Combustion and furnaces; Boilers and steam systems; Compressed air system, instrument air, inert gas; heat transfer medium; refrigeration.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Perry, R.H. and D.W. Green (ed), 1983, Perry's Chemical Engineer's Handbook, 6 Edition, McGraw Hill Book Co., Inc., New York
2. Broughton, J. (ed), 1994, Process Utility System: Introduction to Design, Operation and Maintenance, Institution of Chemical Engineers, Rugby, U.K
3. Sitompul, Darwin (editor penerjemah), 1989, Prinsip-prinsip Konversi Energi, (terjemah dari Principles of Energy Conversion karya Archie W. Culp, Erlangga, Jakarta

TK2202, Mass and Energy Balances (3 SKS)

Short Syllabus

This course dealing with mass and energy balance calculations. Topics cover : Process system mass balance analysis; Solution methods using elemental, species or inert material balance; Mass balance calculations for systems with purge, recycle, bypass, chemical reactions, and physical separations; Energy balance calculations based on process systems mass balance; energy changes in chemical processes, phase change, mixing, combustion, evaporation, humidification, drying.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.
5. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Reklaitis, G.V., 1983, Introduction to Material and Energy Balance, John Wiley & Sons, New York
2. Himmelblau, D.M., 1989, Basic Principles and Calculations in Chemical Engineering, Prentice-Hall, Englewood Cliff, New Jersey
3. Felder, R.M. and R.W. Rousseau, 1986, Elementary Principles of Chemical Processes, John Wiley & Sons, New York

TK2203, Chem Engineering Thermodynamics II (2 SKS)

Short Syllabus

This course dealing with comprehensive thermodynamics principles. Topics cover : Solution properties: partial molar quantities, fugacity and activity; phase equilibrium criteria; ideal and nonideal vapour-liquid equilibrium; Calculation of activity and fugacity coefficients: K-values; Equilibrium phase envelope for single and multicomponent vapour-liquid systems: definitions of critical point, cricondenterm, cricondenbar, retrograde condensation and convergence pressure; Phase equilibrium calculations; Chemical reaction equilibrium criteria; Degree of reaction continuity; Chemical reaction equilibrium constant calculation, influence of temperature and pressure; Homogeneous and heterogeneous reaction equilibria; Homogeneous multiple reaction equilibria: concept of free energy minimization.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Smith, J.M., H.C. van Ness and M.C. Abbott, 1996, Introduction to Chemical Engineering Thermodynamic, 5 Edition, McGraw-Hill Book Co., Inc., New York
2. Daubert, T.E., 1985, Chemical Engineering Thermodynamics, McGraw-Hill Book Co., Inc., New York
3. Sandler, S.I., 1989, Chemical and Engineering Thermodynamics, 2 Edition, John Wiley & Sons, New York

TK2204, Chem Reaction Kinetic and Catalysis (3 SKS)

Short Syllabus

This course dealing with chemical reactions kinetics and basic principles of catalyst. Topics cover : simple consecutive/parallel reactions; Determination of homogeneous reaction rate: kinetic data collection and interpretation techniques; Derivation of reaction rate equation from reaction mechanism; Chemical kinetics theory; Introduction to catalysis; homogeneous catalytic reaction kinetics; Heterogeneous catalytic reaction kinetics.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.
5. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Hill, C.G, 1977, An Introduction to Chemical Engineering Kinetics and Design, John Wiley & Sons, New York
2. Smith,J.M., 1970, Chemical Engineering Kinetics, 2 Edition, McGraw-Hill Book Co., Inc., New York
3. Laidler,K.C., 1986, Chemical Engineering Kinetics, Tata McGraw-Hill Publishing Co., New Delhi

TK2205, Particle and Fluid Mechanics (3 SKS)

Short Syllabus

Fluids, fluid statics and fluid flow; fundamentals of momentum transport and its applications; Fluid flow in pipes; Fluid flow measurement; Fluid pumping; Gas-liquid multiphase flow; Fluid flow through solid particles: settling, packed bed, fluidisation; Mechanical separations: sedimentation, filtration; Introduction to transient flow.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.
5. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Geankoplis, C.J., 1993, Transport Process and Unit Operations, 3 Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jersey
2. Holland, F.A. and R. Bragg, 1995, Fluid Flow for Chemical Engineers, 2 Edition, Edward Arnold, London
3. McCabe, W.L., J.C.Smith and P. Harriott, 1993, Unit Operations of Chemical Engineering, 5 Edition, McGraw-Hill Book Co.,Inc., New York

TK2206, Utility System I (2 SKS)

Short Syllabus

This course dealing with various of utilizations and all matters that related to them. Topics cover : Water sources and qualities; fundamentals of water treatment; industrial/process water, demineralized water, portable water, boiler feedwater, cooling water; desalination systems; Fuels: solid, liquid, and gaseous fuels; Combustion and furnaces; Boilers and steam systems; Compressed air system, instrument air, inert gas; heat transfer medium; refrigeration.

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

Bibliography

1. Perry, R.H. and D.W. Green (ed), 1983, Perry's Chemical Engineer's Handbook, 6 Edition, McGraw Hill Book Co., Inc., New York
2. Broughton, J. (ed), 1994, Process Utility System: Introduction to Design, Operation and Maintenance, Institution of Chemical Engineers, Rugby, U.K
3. Sitompul, Darwin (editor penerjemah), 1989, Prinsip-prinsip Konversi Energi, (terjemah dari Principles of Energy Conversion karya Archie W. Culp, Erlangga, Jakarta)

TK2201, Measurement and Data Interpretation (2 SKS)

Short Syllabus

This course dealing with instrumental systems of measurement. Topics cover : Role of experiments in engineering and technology; Data collection and interpretation requirements; Measurement quality; Characteristics of instruments; Survey of instruments and measurement methods for temperature, pressure, flow rate, liquid level, vapour pressure, density, electrical conductivity, etc.; Graphical and numerical data processing; Variable-screening techniques, factorial design, introduction to experimental design for mechanistic model parameter estimation.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. TK1101 Introduction to Chemical Industries, Prerequisites.
3. TK1201 Introduction to Chem Engineering, Prerequisites.

Bibliography

1. Ray, M.S., 1988, Engineering Experimentation: Ideas, Techniques, Presentation, McGraw Hill Book Co., Inc., New York
2. Gibbings, J.C., 1986, The Systematic Experiment, Cambridge University Press, Cambridge, U.K

TK2201, Measurement and Data Interpretation (2 SKS)

Short Syllabus

This course dealing with instrumental systems of measurement. Topics cover : Role of experiments in engineering and technology; Data collection and interpretation requirements; Measurement quality; Characteristics of instruments; Survey of instruments and measurement methods for temperature, pressure, flow rate, liquid level, vapour pressure, density, electrical conductivity, etc.; Graphical and numerical data processing; Variable-screening techniques, factorial design, introduction to experimental design for mechanistic model parameter estimation.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. TK1101 Introduction to Chemical Industries, Prerequisites.

3. TK1201 Introduction to Chem Engineering, Prerequisites.

Bibliography

1. Ray, M.S., 1988, Engineering Experimentation: Ideas, Techniques, Presentation, McGraw Hill Book Co., Inc., New York
2. Gibbings, J.C., 1986, The Systematic Experiment, Cambridge University Press, Cambridge, U.K

TK3001, Chemical Technology Laboratory I (2 SKS)

Short Syllabus

This laboratory course dealing with important laboratory works in chemical engineering. Topics cover : Fluid flow, agitation tank, heat conductivity of solids, reaction kinetics from temperature measurement, glucose-fructose conversion.

Related Courses

1. TK2204 Chem Reaction Kinetic and Catalysis, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.
3. TK2207 Fundamental of Bioprocess, Prerequisites.
4. TK3003 Bioprocess Technology Laboratory I, Prohibited.
5. TK3005 Food Technology Laboratory I, Prohibited.
6. KI2242 Physical Chemistry of Solution and Colloids, Prerequisites.

Bibliography

1. , “Petunjuk Praktikum Laboratorium Instruksional”, Departemen Teknik Kimia ITB

TK3002, Chemical Technology Laboratory II (3 SKS)

Short Syllabus

This laboratory course dealing with various chemical engineering processes. Topics cover : Solid-liquid extraction, fluidisation, heat transfer, drying, urea-formaldehyde synthesis, gas-liquid contactor.

Related Courses

1. TK3001 Chemical Technology Laboratory I, Prerequisites.
2. TK3004 Bioprocess Technology Laboratory II, Prohibited.
3. TK3006 Food Technology Laboratory II, Prohibited.
4. TK3104 Separation Processes I, Prerequisites.
5. TK3105 Chemical Reaction Engineering, Prerequisites.

Bibliography

1. , “Petunjuk Praktikum Laboratorium Instruksional”, Departemen Teknik Kimia ITB

TK3003, Bioprocess Technology Laboratory I (2 SKS)

Short Syllabus

This laboratory course dealing with various of bioprocesses in chemical engineering. Topics cover : Basic chemical engineering lab practice (Ref. TK3001) supplemented by several specialized lab modules such as: microbial growth kinetics, microbial decomposition of substrate into simpler products.

Related Courses

1. TK2101 Chemical Engineering Mathematics, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.
3. TK2207 Fundamental of Bioprocess, Prerequisites.
4. TK3001 Chemical Technology Laboratory I, Prohibited.
5. TK3005 Food Technology Laboratory I, Prohibited.

Bibliography

1. , “Petunjuk Praktikum Laboratorium Instruksional”, Departemen Teknik Kimia ITB

TK3004, Bioprocess Technology Laboratory II (3 SKS)

Short Syllabus

This laboratory course dealing with various of bioprocesses in chemical engineering. Topics cover : Independent laboratory work on microbiological process problems for the production of metabolites and waste treatment (aerobic and anaerobic processes, batch or continuous processes)

Related Courses

1. TK3002 Chemical Technology Laboratory II, Prohibited.
2. TK3003 Bioprocess Technology Laboratory I, Prerequisites.
3. TK3006 Food Technology Laboratory II, Prohibited.
4. TK3105 Chemical Reaction Engineering, Prerequisites.
5. TK3107 Metabolism and Bioenergetics, Prerequisites.

Bibliography

1. , “Petunjuk Praktikum Laboratorium Instruksional”, Departemen Teknik Kimia ITB

TK3005, Food Technology Laboratory I (2 SKS)

Short Syllabus

This laboratory course dealing with microbiological processes in chemical engineering. Topics cover : Basic chemical engineering laboratory (Ref: TK3001) supplemented by several specialized laboratory modules such as: microbial growth kinetics, microbial decomposition of substrate into simpler products.

Related Courses

1. TK2101 Chemical Engineering Mathematics, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.
3. TK2208 Basics of Food Technology, Prerequisites.
4. TK3001 Chemical Technology Laboratory I, Prohibited.
5. TK3003 Bioprocess Technology Laboratory I, Prohibited.

Bibliography

1. , “Petunjuk Praktikum Laboratorium Instruksional”, Departemen Teknik Kimia ITB

TK3006, Food Technology Laboratory II (3 SKS)

Short Syllabus

This laboratory course dealing with various of microbiological processes. Topics cover : Independent lab work practice on microbial process problems for the production of metabolites and waste treatment (aerobic and anaerobic processes, batch and continuous processes) .

Related Courses

1. TK3002 Chemical Technology Laboratory II, Prohibited.
2. TK3004 Bioprocess Technology Laboratory II, Prohibited.
3. TK3005 Food Technology Laboratory I, Prerequisites.
4. TK3105 Chemical Reaction Engineering, Prerequisites.
5. TK3108 Food Nutritional Science, Prerequisites.

Bibliography

1. , “Petunjuk Praktikum Laboratorium Instruksional”, Departemen Teknik Kimia ITB

TK3101, Product Engineering (2 SKS)

Short Syllabus

This course dealing with functional chemical products such as soap active agents, detergents and emulsifier, paint, etc. Topics cover : Qualitative and quantitative review of functional chemicals such as soap surfactants, detergents, emulsifiers, paints and surface coatings, aerosol products, lubricants, adhesives, etc. The review includes: chemical and physical principles of product applications, product formulations, typical compositions and roles of constituents, general characteristics of additives (anti-corrosion, anti-oxidation, filler, etc.), product formulation operations and process equipment (mixing and blending, emulsification, agglomeration, encapsulation, extrusion, foaming, etc.)

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.

Bibliography

1. , 1985, Ullman's Encyclopedia of Industrial Chemistry, 5 Edition, VCH Verlagsgesellschaft mbH, D-6940 Weinheim, pulu
2. , 1991, Kirk-Othmer's Encyclopedia of Chemical Technology, 4 Edition, John Wiley & Sons, new York, puluhan jilid, 1991 d
3. Patton, T.C., 1979, Paint Flow and Pigment Dispersion, 2 Edition, John Wiley & Sons, New York

TK3102, Utility System II (2 SKS)

Short Syllabus

This course dealing with thermodynamics basic principles in utilization. Topics cover : Thermodynamic cycles for power generation: Carnot, Rankine, Brayton, Diesel and Otto; Steam turbine: steam expansion in turbines, factors influencing turbine performance, steam rate, efficiency, load allocation, mass and enthalpy balance; Gas turbine: factors determining performance, efficiency improvement via combined cycles and waste heat boilers. Cogeneration and steam system in chemical plants (review of TK2206 Utility System I); Electricity: power source (AC, single and three phase), transmission (heat losses), transformers, simple electrical circuits (inductors and capacitors); Electric motors: basics of AC motors, efficiency and power factor, classification of motors and their application in chemical plants; Internal combustion engines: basics of spark-ignited and compression-ignited motors.

Related Courses

1. TK2206 Utility System I, Prerequisites.

Bibliography

1. Perry, R.H, and C.H. Chilton (Editorial Directors), 1973, Chemical Engineer's Handbook, 5 Edition, Mc Graw-Hill Kogakusha, Ltd., 1973, Section 24, P
2. Kam W. Li and A. Paul Priddy, 1985, Power Plant System Design, John Wiley & Sons
3. Sitompul, Darwin (editor penerjemah), 1989, Prinsip-prinsip Konversi Energi, (terjemah dari Principles of Energy Conversion karya Archie W. Culp, Erlangga, Jakarta

TK3103, Heat Transfer (3 SKS)

Short Syllabus

This course dealing with heat transport phenomena in chemical engineering operations. Topics cover : Fundamentals of heat transfer; Heat transfer in fluids without phase change; Heat transfer in fluids with phase change; Heat transfer by radiation; Heat transfer equipment (including air coolers and cooling towers); Evaporation operations and equipment.

Related Courses

1. TK2103 Chem Engineering Thermodynamics I, Prerequisites.

2. TK2205 Particle and Fluid Mechanics, Prerequisites.

Bibliography

1. Geankoplis, C.J., 1993, Transport Process and Unit Operations, 3 Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jers
2. McCabe, W.L., J.C. Smith and P. Harriott, 1993, Unit Operations of Chemical Engineering, 5 Edition, McGraw-Hill Book Co., Inc., New York
3. Coulson, J.M., J.F. Richardson, J.R. Backhurst and, 1977, Chemical Engineering. Volume 1, 3 Edition, Pergamon Press, Oxford

TK3104, Separation Processes I (3 SKS)

Short Syllabus

This course dealing with mass transport in separation processes. Topics cover : Fundamentals of diffusive and convective mass transfer; Interphase mass transfer; Kinetic and equilibrium-stage approaches in diffusive separation process design; Extraction; Absorption; Distillation; introduction to multicomponent distillation.

Related Courses

1. TK2103 Chem Engineering Thermodynamics I, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.

Bibliography

1. Geankoplis, C.J., 1993, Transport Process and Unit Operations, 3 Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jers
2. Henley, E.J., 1981, Equilibrium Stage Separation Operations in Chemical Engineering, John Wiley & Sons. Inc
3. Treybal, R.E., 1980, Mass Transfer Operations, 3 Edition, McGraw-Hill Book Co., Inc., New York

TK3105, Chemical Reaction Engineering (3 SKS)

Short Syllabus

This course dealing with various types of reactors. Topics cover : Introduction to reactor types and factors influencing reactor performance; Basic concepts and calculation techniques for single and multiple ideal reactors at isothermal conditions for single, parallel and simple consecutive reactions; Impact of volume and temperature changes (optimum reaction temperature); Heterogeneous (solid-gas) reactions; Introduction to non-ideal reactors (residence time distribution).

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.

4. TK2102 Process Computation, Prerequisites.

Bibliography

1. Fogler, H.S., 1992, Element of Chemical Reaction Engineering, 2 Edition, Prentice-Hall, Englewood-Cliffs, New Jersey
2. Levenspiel, O., 1972, Chemical Reaction Engineering, 2 Edition, John Wiley & Sons, New York
3. Walas, S.M., 1995, Chemical Reaction Engineering Handbook of Solved Problems, Gordon & Breach Publishers, Amsterdam

TK3106, Mechanical Design of Process Vessel (2 SKS)

Short Syllabus

This course dealing with process equipments design calculations. Topics cover :
Understanding process equipment technical drawings; simple process equipment drafting;
Strength of materials: stress, strain, bending moment; Strength of weld and rivet joints;
Codes and standards for vessel wall thickness.

Related Courses

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Bibliography

1. Bhattacharyya, B.C., 1991, Introduction to Chemical Equipment Design: Mechanical Aspects , CBS Publishers and Distributors, New Delhi
2. Ryder, G.H., 1969, Strength of Materials, 3 Edition, MacMillan, London
3. Sinnott, R.K., 1985, Coulson-Richardson's Chemical Engineering Volume 6: An Introduction to Chemical Engineering Design, Pergamon Press, Oxford, 1985, bab 13.

TK3107, Metabolism and Bioenergetics (3 SKS)

Short Syllabus

This course dealing with bioenergetics and metabolisms of some important compounds. Topics cover ;Bioenergetics; Cell membrane and transport through biomembranes; Enzymes and their activities; Metabolism of carbohydrate, protein and amino acids, fat and fatty acids, and hydrocarbon compounds; Fermentation phenomena; Metabolic process control; Accumulation of primary and secondary metabolic products.

Related Courses

1. TK2201 Measurement and Data Interpretation, Prerequisites.

Bibliography

1. Shuler, M.L. and F. Kargi, 1992, Bioprocess Engineering: Basic Concept, Prentice-Hall, Inc., Englewood Cliffs, N.J
2. Aiba S., A.E. Humphrey and N.F. Millis, 1973, Biochemical Engineering, 2 Edition,

University of Tokyo Press., Tokyo

3. Lehninger, A.L., 1975, Biochemistry , Worth Publishers, Inc., New York

TK3108, Food Nutritional Science (3 SKS)

Short Syllabus

This course dealing with nutrients in food materials. Topics cover : Introduction: definitions and scope; Elements of human nutrition; Nutrients: water, carbohydrate, protein, fat and oil, vitamins, mineral; Bioavailability of nutrients; Calorific value of nutrients; Digestion and absorption of nutrients; Nutrient conversions in human body; Energy metabolism; Carbohydrate metabolism; Lipid metabolism; protein metabolism.

Related Courses

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Bibliography

1. Spakkholz, J.E., M.Boylan, J.A. Driskell, 1998, Nutrition: Chemistry and Biology, 2 Edition, CRC Press, Boca Raton Florida
2. Potter, N.N., J.H. Hotkiss, 1987, Food Science, 5 Edition, Kluwer Academic Publisher
3. Pomeranz, Y., 2001, Fungtional Properties of Food Components, 5 Edition, Academic Press onc., Orlando

TK3101, Product Engineering (2 SKS)

Short Syllabus

This course dealing with functional chemical products such as soap active agents, detergents and emulsifier, paint,etc. Topics cover : Qualitative and quantitative review of functional chemicals such as soap surfactants, detergents, emulsifiers, paints and surface coatings, aerosol products, lubricants, adhesives, etc. The review includes: chemical and physical principles of product applications, product formulations, typical compositions and roles of constituents, general characteristics of additives (anti-corrosion, anti-oxidation, filler, etc.), product formulation operations and process equipment (mixing and blending, emusification, agglomeration, encapsulation, extrusion, foaming, etc.)

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.

Bibliography

1. , 1985, Ullman's Encyclopedia of Industrial Chemistry, 5 Edition, VCH Verlagsgesellschaft mbH, D-6940 Weinheim, pulu
2. , 1991, Kirk-Othmer's Encyclopedia of Chemical Technology, 4 Edition, John Wiley & Sons, new York, puluhan jilid, 1991 d
3. Patton, T.C., 1979, Paint Flow and Pigment Dispersion, 2 Edition, John Wiley & Sons, New York

TK3102, Utility System II (2 SKS)

Short Syllabus

This course dealing with thermodynamics basic principles in utilization. Topics cover : Thermodynamic cycles for power generation: Carnot, Rankine, Brayton, Diesel and Otto; Steam turbine: steam expansion in turbines, factors influencing turbine performance, steam rate, efficiency, load allocation, mass and enthalpy balance; Gas turbine: factors determining performance, efficiency improvement via combined cycles and waste heat boilers. Cogeneration and steam system in chemical plants (review of TK2206 Utility System I); Electricity: power source (AC, single and three phase), transmission (heat losses), transformers, simple electrical circuits (inductors and capacitors); Electric motors: basics of AC motors, efficiency and power factor, classification of motors and their application in chemical plants; Internal combustion engines: basics of spark-ignited and compression-ignited motors.

Related Courses

1. TK2206 Utility System I, Prerequisites.

Bibliography

1. Perry, R.H, and C.H. Chilton (Editorial Directors), 1973, Chemical Engineer's Handbook, 5 Edition, Mc Graw-Hill Kogakusha, Ltd., 1973, Section 24, P
2. Kam W. Li and A. Paul Priddy, 1985, Power Plant System Design, John Wiley & Sons
3. Sitompul, Darwin (editor penerjemah), 1989, Prinsip-prinsip Konversi Energi, (terjemah dari Principles of Energy Conversion karya Archie W. Culp, Erlangga, Jakarta

TK3103, Heat Transfer (3 SKS)

Short Syllabus

This course dealing with heat transport phenomena in chemical engineering operations. Topics cover :Fundamentals of heat transfer; Heat transfer in fluids without phase change; Heat transfer in fluids with phase change; Heat transfer by radiation; Heat transfer equipment (including air coolers and cooling towers); Evaporation operations and equipment.

Related Courses

1. TK2103 Chem Engineering Thermodynamics I, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.

Bibliography

1. Geankoplis, C.J., 1993, Transport Process and Unit Operations, 3 Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jers
2. McCabe, W.L., J.C. Smith and P. Harriott, 1993, Unit Operations of Chemical Engineering, 5 Edition, McGraw-Hill Book Co., Inc., New York

3. Coulson, J.M., J.F. Richardson, J.R. Backhurst and, 1977, Chemical Engineering. Volume 1, 3 Edition, Pergamon Press, Oxford

TK3104, Separation Processes I (3 SKS)

Short Syllabus

This course dealing with mass transport in separation processes. Topics cover : Fundamentals of diffusive and convective mass transfer; Interphase mass transfer; Kinetic and equilibrium-stage approaches in diffusive separation process design; Extraction; Absorption; Distillation; introduction to multicomponent distillation.

Related Courses

1. TK2103 Chem Engineering Thermodynamics I, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.

Bibliography

1. Geankoplis, C.J., 1993, Transport Process and Unit Operations, 3 Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jers
2. Henley, E.J., 1981, Equilibrium Stage Separation Operations in Chemical Engineering, John Wiley & Sons. Inc
3. Treybal, R.E., 1980, Mass Transfer Operations, 3 Edition, McGraw-Hill Book Co., Inc., New York

TK3105, Chemical Reaction Engineering (3 SKS)

Short Syllabus

This course dealing with various types of reactors. Topics cover : Introduction to reactor types and factors influencing reactor performance; Basic concepts and calculation techniques for single and multiple ideal reactors at isothermal conditions for single, parallel and simple consecutive reactions; Impact of volume and temperature changes (optimum reaction temperature); Heterogeneous (solid-gas) reactions; Introduction to non-ideal reactors (residence time distribution).

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.

Bibliography

1. Fogler, H.S., 1992, Element of Chemical Reaction Engineering, 2 Edition, Prentice-Hall, Englewood-Cliffs, New Jersey
2. Levenspiel, O., 1972, Chemical Reaction Engineering, 2 Edition, John Wiley & Sons, New York

3. Walas, S.M., 1995, Chemical Reaction Engineering Handbook of Solved Problems, Gordon & Breach Publishers, Amsterdam

TK3101, Product Engineering (2 SKS)

Short Syllabus

This course dealing with functional chemical products such as soap active agents, detergents and emulsifier, paint, etc. Topics cover : Qualitative and quantitative review of functional chemicals such as soap surfactants, detergents, emulsifiers, paints and surface coatings, aerosol products, lubricants, adhesives, etc. The review includes: chemical and physical principles of product applications, product formulations, typical compositions and roles of constituents, general characteristics of additives (anti-corrosion, anti-oxidation, filler, etc.), product formulation operations and process equipment (mixing and blending, emulsification, agglomeration, encapsulation, extrusion, foaming, etc.)

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.

Bibliography

1. , 1985, Ullman's Encyclopedia of Industrial Chemistry, 5 Edition, VCH Verlagsgesellschaft mbH, D-6940 Weinheim, pulu
2. , 1991, Kirk-Othmer's Encyclopedia of Chemical Technology, 4 Edition, John Wiley & Sons, new York, puluhan jilid, 1991 d
3. Patton, T.C., 1979, Paint Flow and Pigment Dispersion, 2 Edition, John Wiley & Sons, New York

TK3102, Utility System II (2 SKS)

Short Syllabus

This course dealing with thermodynamics basic principles in utilization. Topics cover : Thermodynamic cycles for power generation: Carnot, Rankine, Brayton, Diesel and Otto; Steam turbine: steam expansion in turbines, factors influencing turbine performance, steam rate, efficiency, load allocation, mass and enthalpy balance; Gas turbine: factors determining performance, efficiency improvement via combined cycles and waste heat boilers. Cogeneration and steam system in chemical plants (review of TK2206 Utility System I); Electricity: power source (AC, single and three phase), transmission (heat losses), transformers, simple electrical circuits (inductors and capacitors); Electric motors: basics of AC motors, efficiency and power factor, classification of motors and their application in chemical plants; Internal combustion engines: basics of spark-ignited and compression-ignited motors.

Related Courses

1. TK2206 Utility System I, Prerequisites.

Bibliography

1. Perry, R.H, and C.H. Chilton (Editorial Directors), 1973, Chemical Engineer's Handbook, 5 Edition, Mc Graw-Hill Kogakusha, Ltd., 1973, Section 24, P
2. Kam W. Li and A. Paul Priddy, 1985, Power Plant System Design, John Wiley & Sons
3. Sitompul, Darwin (editor penerjemah), 1989, Prinsip-prinsip Konversi Energi, (terjemah dari Principles of Energy Conversion karya Archie W. Culp, Erlangga, Jakarta

TK3103, Heat Transfer (3 SKS)

Short Syllabus

This course dealing with heat transport phenomena in chemical engineering operations. Topics cover :Fundamentals of heat transfer; Heat transfer in fluids without phase change; Heat transfer in fluids with phase change; Heat transfer by radiation; Heat transfer equipment (including air coolers and cooling towers); Evaporation operations and equipment.

Related Courses

1. TK2103 Chem Engineering Thermodynamics I, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.

Bibliography

1. Geankoplis, C.J., 1993, Transport Process and Unit Operations, 3 Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jers
2. McCabe, W.L., J.C. Smith and P. Harriott, 1993, Unit Operations of Chemical Engineering, 5 Edition, McGraw-Hill Book Co., Inc., New York
3. Coulson, J.M., J.F. Richardson, J.R. Backhurst and, 1977, Chemical Engineering. Volume 1, 3 Edition, Pergamon Press, Oxford

TK3104, Separation Processes I (3 SKS)

Short Syllabus

This course dealing with mass transport in separation processes. Topics cover : Fundamentals of diffusive and convective mass transfer; Interphase mass transfer; Kinetic and equilibrium-stage approaches in diffusive separation process design; Extraction; Absorption; Distillation; introduction to multicomponent distillation.

Related Courses

1. TK2103 Chem Engineering Thermodynamics I, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.

Bibliography

1. Geankoplis, C.J., 1993, Transport Process and Unit Operations, 3 Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jers

2. Henley, E.J., 1981, Equilibrium Stage Separation Operations in Chemical Engineering, John Wiley & Sons. Inc
3. Treybal, R.E., 1980, Mass Transfer Operations, 3 Edition, McGraw-Hill Book Co., Inc., New York

TK3105, Chemical Reaction Engineering (3 SKS)

Short Syllabus

This course dealing with various types of reactors. Topics cover : Introduction to reactor types and factors influencing reactor performance; Basic concepts and calculation techniques for single and multiple ideal reactors at isothermal conditions for single, parallel and simple consecutive reactions; Impact of volume and temperature changes (optimum reaction temperature); Heterogeneous (solid-gas) reactions; Introduction to non-ideal reactors (residence time distribution).

Related Courses

1. TK1101 Introduction to Chemical Industries, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.
3. TK2101 Chemical Engineering Mathematics, Prerequisites.
4. TK2102 Process Computation, Prerequisites.

Bibliography

1. Fogler, H.S., 1992, Element of Chemical Reaction Engineering, 2 Edition, Prentice-Hall, Englewood-Cliffs, New Jersey
2. Levenspiel, O., 1972, Chemical Reaction Engineering, 2 Edition, John Wiley & Sons, New York
3. Walas, S.M., 1995, Chemical Reaction Engineering Handbook of Solved Problems, Gordon & Breach Publishers, Amsterdam

TK3201, Material of Construction&Corrosion (3 SKS)

Short Syllabus

This course dealing with construction materials properties and metal corrosion. Topics cover : General review of materials of construction, including types and performance limitations of materials (metals non-metals composites); Raw materials and production of construction materials; Compositions and characteristics of non-ferrous metals and alloys; Composition and properties of ferrous metals and alloys including phase diagram, iron-carbon system, heat treatment, chemical, mechanical and electrical properties; Polymeric materials: types and thermal and mechanical properties, production, forming and joining of polymers; Composites: fibres, particles and foams; Design with polymers and composites; Types of corrosion and strength degradation, fundamentals of metal, ceramic and polymer corrosion; Corrosion of metals and concrete by seawater; Corrosion prevention techniques for piping systems and process equipment; Evaluation of corrosion by gases and solutions; Abrasion.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. KI1211 Basic Chemistry II A, Prerequisites.

Bibliography

1. Callister Jr., W.D., 1985, Materials Science and Engineering, An Introduction, John Wiley & Sons, New York
2. Schweitzer, P.A. (ed.), 1989, Corrosion and Corrosion Protection Handbook , Marcel Dekker, Inc., New York

TK3202, Transport Phenomena (3 SKS)**Short Syllabus**

This course dealing with mathematics formulations in transport phenomena. Topics cover : Basic laws of one-dimensional diffusive transport: momentum, heat and mass diffusion and their analogies; characteristics of transport process; Diffusion with internal generation; Multiphase systems and transport coefficients; Convective transport; Transport in turbulent condition; Non-steady state transport; Introduction to multidimensional transport.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. MA1222 Calculus II, Prerequisites.

Bibliography

1. Fahien, R.W., 1983, Fundamentals of Transport Phenomena, McGraw-Hill Book Co., Inc., New York
2. Bird, R. B., W.E. Stewart, and E.N. Lightfoot, 2002, Transport Phenomena 2nd ed., John Wiley & Sons, New York
3. Broadkey, R.S. and H.C. Hersey, 1988, Transport Phenomena: A Unified Approach, McGraw-Hill Book Co., Inc., New York

TK3203, Chemical Process Industries (3 SKS)**Short Syllabus**

This course dealing with various of chemical engineering processes. Topics cover : (big or small scale) as related to process synthesis or utilization of natural resources: potential product description and characteristics of its application; synthesis route and raw material alternatives; review of typical modern processes and their operating conditions and principle technical advantages; future trends in chemical processes including aspects of sustainability; Indonesian industry and sustainability.

Related Courses

1. KI2051 Organic Chemistry, Prerequisites.

2. TK1201 Introduction to Chem Engineering, Prerequisites.

Bibliography

1. Tatang H. Soerawidjaja, 2003, Diktat Kuliah Proses Industri Kimia, Departemen Teknik Kimia, Institut Teknologi Bandung
2. , 1985, Ullman's Encyclopedia of Industrial Chemistry, 5 Edition, VCH Verlagsgesellschaft mbH, D-6940 Weinheim, pulu
3. , 1991, Kirk-Othmer's Encyclopedia of Chemical Technology, 4 Edition, John Wiley & Sons, new York, puluhan jilid, 1991 d

TK3204, Chemical Process Control (3 SKS)

Short Syllabus

This course dealing with chemical engineering processes controls. Topics cover: Introduction to characteristics of process control problems and the objectives of process control; Brief review on the design of process control systems; Control system hardware and modelling of dynamic behaviour of chemical processes; Analysis of chemical process dynamics; Analysis and design of feedback control system; Analysis and design of advanced control systems.

Related Courses

1. TK2101 Chemical Engineering Mathematics, Prerequisites.
2. TK2204 Chem Reaction Kinetic and Catalysis, Prerequisites.

Bibliography

1. Coughanowr, D.R., 1991, Process System Analysis and Control, 2 Edition, McGraw-Hill Book Co., Inc., New York
2. Stephanopoulos, G., 1984, Chemical Process Control: An Introduction to Theory and Practice, Prentice-Hall, Englewood Cliffs, New Jersey
3. Seborg, D.E., T.F. Edgar, and D.A. Melichamp, 1998, Process Dynamics and Control, 2 Edition, John Wiley and Sons, New York

TK3205, Separation Processes II (2 SKS)

Short Syllabus

This course dealing with several separation processes. Topics cover : Hydraulic design of plate and packed columns; Liquid-liquid and fluid-solid separation processes; Membrane assisted separation; Humidification and drying.

Related Courses

1. TK3104 Separation Processes I, Prerequisites.
2. TK4005 Downstrm Processing in Bioproc Ind, Prerequisites.

Bibliography

1. Sinnott, R.K., 1985, Coulson-Richardson's Chemical Engineering Volume 6: An Introduction to Chemical Engineering Design, Pergamon Press, Oxford, 1985, bab 13.
2. Geankoplis, C.J., 1993, Transport Process and Unit Operations, 3 Edition, Prentice-Hall, Inc., Englewood Cliffs, New Jersey
3. McCabe, W.L., J.C.Smith and P. Harriott, 1993, Unit Operations of Chemical Engineering, 5 Edition, McGraw-Hill Book Co., Inc., New York

TK3206, Bioreactor Design and Analysis (2 SKS)

Short Syllabus

This course dealing with bioreactors. Topics cover :Introduction; Enzyme kinetics, immobilized enzymes, suspended and immobilized enzyme catalytic bioreactor; Ideal bioreactors: chemostat, plug-flow, fed-batch; Transport phenomena in bioprocess systems: interphase, diffusion in biofilm-floc, determination of transport coefficients, agitation power, evaluation of oxygen transport rate as a function of operating variables; Cell bioreactor: batch, fed-batch; continuous culture and its modification; immobilized cell system; Bioreactor design: types of bioreactors, bioreactors operation, bioreactor selection criteria.

Related Courses

1. TK3105 Chemical Reaction Engineering, Prerequisites.
2. TK3107 Metabolism and Bioenergetics, Prerequisites.

Bibliography

1. Bailey, J.E., and D.F. Ollis, 1986, Biochemical Engineering Fundamentals, 2 Edition, McGraw-Hill Book Company Inc., New York
2. Shuler, M.L. and F. Kargi, 1992, Bioprocess Engineering: Basic Concepts, Prentice-Hall, Inc., Englewood Cliffs, N.J
3. Schugerl, K. , 1987, Bioreaction Engineering, Vol. 1 dan 2, John Wiley and Sons, Chichester, 1987 dan 1991

TK3207, Packaging Technology (2 SKS)

Short Syllabus

This course dealing with product packaging, especially food packaging. Topics cover :Introduction to packaging materials for food; principles of packaging; roles of packaging; properties of metals, glass, paper and polymers for packaging; design, manufacture and application of packaging for food products; packaging for fresh and processed food, including fruits, vegetables, dairy products, dry foods, and beverages.

Related Courses

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Bibliography

1. Robertson, G.L., 1993, Food Packaging : Principles and Practice, Marcel Dekker, New York, [USA]
2. Hanlon. J.F., H.E.. Forcinio, and R.J. Kelsey, 1998, Handbook of Packaging Engineering, CRC Press, Boca Raton,FL, [USA]
3. Brody, A.L., and K.S. Marsh, [Editors], 1997, The Wiley Encyclopedia of Packag-ing Technology, Wiley – International, New York, [USA]

TK3201, Material of Construction&Corrosion (3 SKS)

Short Syllabus

This course dealing with construction materials properties and metal corrosion. Topics cover : General review of materials of construction, including types and performance limitations of materials (metals non-metals composites); Raw materials and production of construction materials; Compositions and characteristics of non-ferrous metals and alloys; Composition and properties of ferrous metals and alloys including phase diagram, iron-carbon system, heat treatment, chemical, mechanical and electrical properties; Polymeric materials: types and thermal and mechanical properties, production, forming and joining of polymers; Composites: fibres, particles and foams; Design with polymers and composites; Types of corrosion and strength degradation, fundamentals of metal, ceramic and polymer corrosion; Corrosion of metals and concrete by seawater; Corrosion prevention techniques for piping systems and process equipment; Evaluation of corrosion by gases and solutions; Abrasion.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. KI1211 Basic Chemistry II A, Prerequisites.

Bibliography

1. Callister Jr., W.D., 1985, Materials Science and Engineering, An Introduction, John Wiley & Sons, New York
2. Schweitzer, P.A. (ed.), 1989, Corrosion and Corrosion Protection Handbook , Marcel Dekker, Inc., New York

TK3203, Chemical Process Industries (3 SKS)

Short Syllabus

This course dealing with various of chemical engineering processes. Topics cover : (big or small scale) as related to process synthesis or utilization of natural resources: potential product description and characteristics of its application; synthesis route and raw material alternatives; review of typical modern processes and their operating conditions and principle technical advantages; future trends in chemical processes including aspects of sustainability; Indonesian industry and sustainability.

Related Courses

1. KI2051 Organic Chemistry, Prerequisites.

2. TK1201 Introduction to Chem Engineering, Prerequisites.

Bibliography

1. Tatang H. Soerawidjaja, 2003, Diktat Kuliah Proses Industri Kimia, Departemen Teknik Kimia, Institut Teknologi Bandung
2. , 1985, Ullman's Encyclopedia of Industrial Chemistry, 5 Edition, VCH Verlagsgesellschaft mbH, D-6940 Weinheim, pulu
3. , 1991, Kirk-Othmer's Encyclopedia of Chemical Technology, 4 Edition, John Wiley & Sons, new York, puluhan jilid, 1991 d

TK3204, Chemical Process Control (3 SKS)

Short Syllabus

This course dealing with chemical engineering processes controls. Topics cover: Introduction to characteristics of process control problems and the objectives of process control; Brief review on the design of process control systems; Control system hardware and modelling of dynamic behaviour of chemical processes; Analysis of chemical process dynamics; Analysis and design of feedback control system; Analysis and design of advanced control systems.

Related Courses

1. TK2101 Chemical Engineering Mathematics, Prerequisites.
2. TK2204 Chem Reaction Kinetic and Catalysis, Prerequisites.

Bibliography

1. Coughanowr, D.R., 1991, Process System Analysis and Control, 2 Edition, McGraw-Hill Book Co., Inc., New York
2. Stephanopoulos, G., 1984, Chemical Process Control: An Introduction to Theory and Practice, Prentice-Hall, Englewood Cliffs, New Jersey
3. Seborg, D.E., T.F. Edgar, and D.A. Mellichamp, 1998, Process Dynamics and Control, 2 Edition, John Wiley and Sons, New York

TK3202, Transport Phenomena (3 SKS)

Short Syllabus

This course dealing with mathematics formulations in transport phenomena. Topics cover : Basic laws of one-dimensional diffusive transport: momentum, heat and mass diffusion and their analogies; characteristics of transport process; Diffusion with internal generation; Multiphase systems and transport coefficients; Convective transport; Transport in turbulent condition; Non-steady state transport; Introduction to multidimensional transport.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.

2. MA1222 Calculus II, Prerequisites.

Bibliography

1. Fahien, R.W., 1983, Fundamentals of Transport Phenomena, McGraw-Hill Book Co., Inc., New York
2. Bird, R. B., W.E. Stewart, and E.N. Lightfoot, 2002, Transport Phenomena 2nd ed., John Wiley & Sons, New York
3. Broadkey, R.S. and H.C. Hersey, 1988, Transport Phenomena: A Unified Approach, McGraw-Hill Book Co., Inc., New York

TK3201, Material of Construction & Corrosion (3 SKS)

Short Syllabus

This course dealing with construction materials properties and metal corrosion. Topics cover : General review of materials of construction, including types and performance limitations of materials (metals non-metals composites); Raw materials and production of construction materials; Compositions and characteristics of non-ferrous metals and alloys; Composition and properties of ferrous metals and alloys including phase diagram, iron-carbon system, heat treatment, chemical, mechanical and electrical properties; Polymeric materials: types and thermal and mechanical properties, production, forming and joining of polymers; Composites: fibres, particles and foams; Design with polymers and composites; Types of corrosion and strength degradation, fundamentals of metal, ceramic and polymer corrosion; Corrosion of metals and concrete by seawater; Corrosion prevention techniques for piping systems and process equipment; Evaluation of corrosion by gases and solutions; Abrasion.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. KI1211 Basic Chemistry II A, Prerequisites.

Bibliography

1. Callister Jr., W.D., 1985, Materials Science and Engineering, An Introduction, John Wiley & Sons, New York
2. Schweitzer, P.A. (ed.), 1989, Corrosion and Corrosion Protection Handbook , Marcel Dekker, Inc., New York

TK3202, Transport Phenomena (3 SKS)

Short Syllabus

This course dealing with mathematics formulations in transport phenomena. Topics cover : Basic laws of one-dimensional diffusive transport: momentum, heat and mass diffusion and their analogies; characteristics of transport process; Diffusion with internal generation; Multiphase systems and transport coefficients; Convective transport; Transport in turbulent condition; Non-steady state transport; Introduction to

multidimensional transport.

Related Courses

1. FI1201 Elementary Physics IIA, Prerequisites.
2. MA1222 Calculus II, Prerequisites.

Bibliography

1. Fahien, R.W., 1983, Fundamentals of Transport Phenomena, McGraw-Hill Book Co., Inc., New York
2. Bird, R. B., W.E. Stewart, and E.N. Lightfoot, 2002, Transport Phenomena 2nd ed., John Wiley & Sons, New York
3. Broadkey, R.S. and H.C. Hersey, 1988, Transport Phenomena: A Unified Approach, McGraw-Hill Book Co., Inc., New York

TK3204, Chemical Process Control (3 SKS)

Short Syllabus

This course dealing with chemical engineering processes controls. Topics cover: Introduction to characteristics of process control problems and the objectives of process control; Brief review on the design of process control systems; Control system hardware and modelling of dynamic behaviour of chemical processes; Analysis of chemical process dynamics; Analysis and design of feedback control system; Analysis and design of advanced control systems.

Related Courses

1. TK2101 Chemical Engineering Mathematics, Prerequisites.
2. TK2204 Chem Reaction Kinetic and Catalysis, Prerequisites.

Bibliography

1. Coughanowr, D.R., 1991, Process System Analysis and Control, 2 Edition, McGraw-Hill Book Co., Inc., New York
2. Stephanopoulos, G., 1984, Chemical Process Control: An Introduction to Theory and Practice, Prentice-Hall, Englewood Cliffs, New Jersey
3. Seborg, D.E., T.F. Edgar, and D.A. Mellichamp, 1998, Process Dynamics and Control, 2 Edition, John Wiley and Sons, New York

TK3203, Chemical Process Industries (3 SKS)

Short Syllabus

This course dealing with various of chemical engineering processes. Topics cover : (big or small scale) as related to process synthesis or utilization of natural resources: potential product description and characteristics of its application; synthesis route and raw material alternatives; review of typical modern processes and their operating conditions and principle technical advantages; future trends in chemical processes including aspects of

sustainability; Indonesian industry and sustainability.

Related Courses

1. KI2051 Organic Chemistry, Prerequisites.
2. TK1201 Introduction to Chem Engineering, Prerequisites.

Bibliography

1. Tatang H. Soerawidjaja, 2003, Diktat Kuliah Proses Industri Kimia, Departemen Teknik Kimia, Institut Teknologi Bandung
2. , 1985, Ullman's Encyclopedia of Industrial Chemistry, 5 Edition, VCH Verlagsgesellschaft mbH, D-6940 Weinheim, pulu
3. , 1991, Kirk-Othmer's Encyclopedia of Chemical Technology, 4 Edition, John Wiley & Sons, new York, puluhan jilid, 1991 d

TK4000, Additive and Flavour Technology (3 SKS)

Short Syllabus

This course dealing with various of food additives and their technologies. Topics cover : Antioxidant; Emulsifier and stabilizer;etc.

Related Courses

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Bibliography

1. Taylor, A.J., Food Flavor Technology, CRC Press
2. Branen, A. L., R.M. Davidson, S. Salminen dan J.H., 2001, Food Additives, C.H.I.P.S., Texas
3. Heath, H. dan Reineccius, G., 1986, Flavor Chemistry and Technology, Kluwer Academic Publishers, Dordrecht

TK4001, Chem Plant Economics Evaluations (2 SKS)

Short Syllabus

This course dealing with capital calculations and feasibilities of chemical plant designs. Topics cover : Sizing of primary and supporting process equipment for a production process; estimation of equipment and production cost for a specified production rate; cash flow analysis

Related Courses

1. TK2202 Mass and Energy Balances, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.
3. TK3103 Heat Transfer, Prerequisites.
4. TK3104 Separation Processes I, Prerequisites.

Bibliography

1. Garret, D.E., 1989, Chemical Engineering Economics, V, N. Reinhold, New York
2. Allan ,DH., 1991, Economic Evaluation of Projects: A Guide, 3 Edition, Institution of Chemical Engineers,
3. Valle, JF., Reistra, 1953, Project Evaluation: In the Chemical Process Industries, McGraw-Hill Book Company, New York

TK4002, Industrial Waste Management (2 SKS)

Short Syllabus

This course dealing with industrial disposal. Topics cover :General review of environmental and pollution problems associated with industries; environmental management laws and regulations in Indonesia; environmental quality standards and quality parameters; environmental impact analysis for industry; air pollution control; water pollution control; soil pollution control and treatment of domestic and industrial solid waste; ultimate disposal system; problems and treatment of hazardous and toxic waste; environmental management systems, waste minimization; environmental audit and ISO-14001; cleaner production as an alternative to ‘clean-up technologies’.

Related Courses

1. KI2051 Organic Chemistry, Prerequisites.
2. TK1101 Introduction to Chemical Industries, Prerequisites.
3. TK1201 Introduction to Chem Engineering, Prerequisites.
4. TK2104 Industrial Microbiology, Prerequisites.

Bibliography

1. Allen, DT& Shonnard, DR, 2002, Green Engineering: Environmentally Conscious Design of Chemical Proceses, Prentice Hall, NJ
2. Azad, HS (ed), 1979, Industrial Waste Water Management Handbook, Mc Graw Hill Book Co., Inc
3. Bishop, PL, 2000, Pollution Prevention: Fundamentals and Practice, Mc Graw Hill Series in Water Resources and Environm, Mc Graw Hill Companies, Inc., New York

TK4003, Chemical Process Design (3 SKS)

Short Syllabus

This course dealing with process designs in chemical plants. Topics cover : Process design in chemical plant engineering; reaction path synthesis; reactor selection; separation process selection; process flow sheet and structure synthesis; design of utility systems and heat exchanger networks; determination of the sensitivity of optimal operation to changes in operational variables; safety and health aspects, waste minimization and treatment.

Related Courses

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Bibliography

1. Rudd, D.F., G.J., 1973, Powers and Sirola, Process Synthesis, Prentice-Hall, Englewood Clift, New Jersey
2. Smith, R., 1996, Chemical Process Design, McGraw-Hill Book Co., Inc., New York
3. Biegler, L.T., I.E. Grossmann and A.W. Westerberg, 1997, Systematic Methods of Chemical Process Design, Prentice-Hall, Englewood Cliffs, N.J.

TK4004, Project Management (2 SKS)

Short Syllabus

This course dealing with project management. Topics cover :Project management overview; Project scope and project engineering; Project control; Project implementation; Project organization; Project finance; Project Integration.

Related Courses

1. TK4001 Chem Plant Economics Evaluations, Prerequisites.

Bibliography

1. Ludwig, E.E., 1998, Applied Project Engineering and Management, 2nd ed, Gulf Publishing Co., Houston, TX
2. Iman Soeharto, 1995, Manajemen Proyek: dari Konseptual sampai Operasional, Penerbit Erlangga, Jakarta
3. Cleland, K., 1981, Engineering Management, McGraw-Hill Book Co., Inc., New York

TK4005, Downstrm Processing in Bioproc Ind (3 SKS)

Short Syllabus

This course dealing with downstream bioprocess industries. Topics cover : Unique characteristics of bioprocesses and downstream process products; available unit operations and major process steps; basic review of process design; hydraulic design of plate and packed columns; specific process steps and unit operations: cell separation, filtration, centrifugation, cell disintegration; product isolation: extraction, adsorption; product purification: chromatography, precipitation, ultrafiltration, electrophoresis; product finishing: crystallization and drying.

Related Courses

1. TK3204 Chemical Process Control, Prohibited.

Bibliography

1. Belter, P.A., E.L. Cussler and W.S.Hu, 1988, Bioseparation, Downstream Processing for Biotechnology, John Wiley & Sons, New York
2. Krijgsman, J., 1992, Product Recovery in Bioprocess Technology, Butterworth Heinemann

3. Verral, M.S. and M.J. Hudson, 1987, Separation for Biotechnology, Ellis Horwood Limited

TK4006, Food Processing Technology (3 SKS)

Short Syllabus

This course dealing with various of food processing. Topics cover : Fundamentals of food processing technology studies; processes and operations at ambient temperature and at minimum heating; processes and operations involving heat application (using steam, hot air and hot oil); processes and operations involving heat release from food (chilling, freezing).

Related Courses

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Bibliography

1. Fellow, P.J., 2000, Food Processing Technology, Midway technology Limited, Cambridge, UK
2. Ibanz, A., Barbosa-Canos GV, 2002, Unit Operations in Food Engineering, CRS Press
3. Farral, AW., 1976, Food Engineering Systems, The AVI Publishing Company Inc., Westpoint, Connec

TK4007, Chemical Process Safety (2 SKS)

Short Syllabus

This course dealing with principles of chemical plant safety. Topics cover : Toxicology, Industrial Hygiene, Source Models, Source and Dispersion, Fires and Explosions, Relief and Safety Devices, case studies.

Related Courses

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Bibliography

1. Crowl, D.A. and Louvar, J.F., 1990, Chemical Process Safety: Fundamental with Application, Prentice Hall Inc

TK4008, Bioprocess Industrial (3 SKS)

Short Syllabus

This course dealing with bioprocess industries. Topics cover : Introduction to domestic and international bioprocess industries; design of SIP (sterilization in place) and CIP (cleaning in place) processes; application of kinetic models in process evaluation; process control and scale-up; bio-safety; microbial enhanced oil recovery; traditional and modern bioprocess industrial products: food, industrial chemicals (ethanol, organic acids, etc.), fine chemicals (vitamins, enzymes, etc.), single cell protein, antibiotics.

Related Courses

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Bibliography

1. Crueger, W. and A. Crueger, 1984, Biotechnology: A Textbook of Industrial Microbiology, Sinauer Associates Inc., Sunderland
2. Young, M. Moo (ed.), 1985, Comprehensive Biotechnology, Volume 3: Current Commodity Products, Pergamon Press, Oxford, U.K.
3. Lydersen, B.K., N.A. D'Elia, and K.M. Nelson, (Eds), 1994, Bioprocess Engineering, Wiley – Interscience, New York, [USA]

TK4009, Food Quality Control & Regulation (3 SKS)

Short Syllabus

This course dealing with food quality standards and control. Topics cover : Food Quality Control, Safety and Regulations.

Related Courses

1. TK4001 Chem Plant Economics Evaluations, Prerequisites.

Bibliography

1. McSwane, D., Rue, Nancy R., Linton R., Essentials of Food Safety and Sanitation, 3 Edition, Prentice Hall Inc

TK4001, Chem Plant Economics Evaluations (2 SKS)

Short Syllabus

This course dealing with capital calculations and feasibilities of chemical plant designs. Topics cover : Sizing of primary and supporting process equipment for a production process; estimation of equipment and production cost for a specified production rate; cash flow analysis

Related Courses

1. TK2202 Mass and Energy Balances, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.
3. TK3103 Heat Transfer, Prerequisites.
4. TK3104 Separation Processes I, Prerequisites.

Bibliography

1. Garret, D.E., 1989, Chemical Engineering Economics, V, N. Reinhold, New York
2. Allan, D.H., 1991, Economic Evaluation of Projects: A Guide, 3 Edition, Institution of Chemical Engineers,

3. Valle, JF., Reistra, 1953, Project Evaluation: In the Chemical Process Industries, McGraw-Hill Book Company, New York

TK4002, Industrial Waste Management (2 SKS)

Short Syllabus

This course dealing with industrial disposal. Topics cover :General review of environmental and pollution problems associated with industries; environmental management laws and regulations in Indonesia; environmental quality standards and quality parameters; environmental impact analysis for industry; air pollution control; water pollution control; soil pollution control and treatment of domestic and industrial solid waste; ultimate disposal system; problems and treatment of hazardous and toxic waste; environmental management systems, waste minimization; environmental audit and ISO-14001; cleaner production as an alternative to ‘clean-up technologies’.

Related Courses

1. KI2051 Organic Chemistry, Prerequisites.
2. TK1101 Introduction to Chemical Industries, Prerequisites.
3. TK1201 Introduction to Chem Engineering, Prerequisites.
4. TK2104 Industrial Microbiology, Prerequisites.

Bibliography

1. Allen, DT& Shonnard, DR, 2002, Green Engineering: Environmentally Conscious Design of Chemical Processes, Prentice Hall, NJ
2. Azad, HS (ed), 1979, Industrial Waste Water Management Handbook, Mc Graw Hill Book Co., Inc
3. Bishop, PL, 2000, Pollution Prevention: Fundamentals and Practice, Mc Graw Hill Series in Water Resources and Environm, Mc Graw Hill Companies, Inc., New York

TK4003, Chemical Process Design (3 SKS)

Short Syllabus

This course dealing with process designs in chemical plants. Topics cover : Process design in chemical plant engineering; reaction path synthesis; reactor selection; separation process selection; process flow sheet and structure synthesis; design of utility systems and heat exchanger networks; determination of the sensitivity of optimal operation to changes in operational variables; safety and health aspects, waste minimization and treatment.

Related Courses

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Bibliography

1. Rudd, D.F., G.J., 1973, Powers and Sirola, Process Synthesis, Prentice-Hall, Englewood Clift, New Jersey

2. Smith, R., 1996, Chemical Process Design, McGraw-Hill Book Co., Inc., New York
3. Biegler, L.T., I.E. Grossmann and A.W. Westerberg, 1997, Systematic Methods of Chemical Process Design, Prentice-Hall, Englewood Cliffs, N.J.

TK4004, Project Management (2 SKS)

Short Syllabus

This course dealing with project management. Topics cover :Project management overview; Project scope and project engineering; Project control; Project implementation; Project organization; Project finance; Project Integration.

Related Courses

1. TK4001 Chem Plant Economics Evaluations, Prerequisites.

Bibliography

1. Ludwig, E.E., 1998, Applied Project Engineering and Management, 2nd ed, Gulf Publishing Co., Houston, TX
2. Iman Soeharto, 1995, Manajemen Proyek: dari Konseptual sampai Operasional, Penerbit Erlangga, Jakarta
3. Cleland, K., 1981, Engineering Management, McGraw-Hill Book Co., Inc., New York

TK4001, Chem Plant Economics Evaluations (2 SKS)

Short Syllabus

This course dealing with capital calculations and feasibilities of chemical plant designs. Topics cover : Sizing of primary and supporting process equipment for a production process; estimation of equipment and production cost for a specified production rate; cash flow analysis

Related Courses

1. TK2202 Mass and Energy Balances, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.
3. TK3103 Heat Transfer, Prerequisites.
4. TK3104 Separation Processes I, Prerequisites.

Bibliography

1. Garret, D.E., 1989, Chemical Engineering Economics, V, N. Reinhold, New York
2. Allan ,DH., 1991, Economic Evaluation of Projects: A Guide, 3 Edition, Institution of Chemical Engineers,
3. Valle, JF., Reistra, 1953, Project Evaluation: In the Chemical Process Industries, McGraw-Hill Book Company, New York

TK4002, Industrial Waste Management (2 SKS)

Short Syllabus

This course dealing with industrial disposal. Topics cover :General review of environmental and pollution problems associated with industries; environmental management laws and regulations in Indonesia; environmental quality standards and quality parameters; environmental impact analysis for industry; air pollution control; water pollution control; soil pollution control and treatment of domestic and industrial solid waste; ultimate disposal system; problems and treatment of hazardous and toxic waste; environmental management systems, waste minimization; environmental audit and ISO-14001; cleaner production as an alternative to ‘clean-up technologies’.

Related Courses

1. KI2051 Organic Chemistry, Prerequisites.
2. TK1101 Introduction to Chemical Industries, Prerequisites.
3. TK1201 Introduction to Chem Engineering, Prerequisites.
4. TK2104 Industrial Microbiology, Prerequisites.

Bibliography

1. Allen, DT& Shonnard, DR, 2002, Green Engineering: Environmentally Conscious Design of Chemical Processes, Prentice Hall, NJ
2. Azad, HS (ed), 1979, Industrial Waste Water Management Handbook, Mc Graw Hill Book Co., Inc
3. Bishop, PL, 2000, Pollution Prevention: Fundamentals and Practice, Mc Graw Hill Series in Water Resources and Environm, Mc Graw Hill Companies, Inc., New York

TK4003, Chemical Process Design (3 SKS)

Short Syllabus

This course dealing with process designs in chemical plants. Topics cover : Process design in chemical plant engineering; reaction path synthesis; reactor selection; separation process selection; process flow sheet and structure synthesis; design of utility systems and heat exchanger networks; determination of the sensitivity of optimal operation to changes in operational variables; safety and health aspects, waste minimization and treatment.

Related Courses

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Bibliography

1. Rudd, D.F., G.J., 1973, Powers and Sirola, Process Synthesis, Prentice-Hall, Englewood Clift, New Jersey
2. Smith, R., 1996, Chemical Process Design, McGraw-Hill Book Co., Inc., New York
3. Biegler, L.T., I.E. Grossmann and A.W. Westerberg, 1997, Systematic Methods of Chemical Process Design, Prentice-Hall, Englewood Cliffs, N.J.

TK4004, Project Management (2 SKS)

Short Syllabus

This course dealing with project management. Topics cover :Project management overview; Project scope and project engineering; Project control; Project implementation; Project organization; Project finance; Project Integration.

Related Courses

1. TK4001 Chem Plant Economics Evaluations, Prerequisites.

Bibliography

1. Ludwig, E.E., 1998, Applied Project Engineering and Management, 2nd ed, Gulf Publishing Co., Houston, TX
2. Iman Soeharto, 1995, Manajemen Proyek: dari Konseptual sampai Operasional, Penerbit Erlangga, Jakarta
3. Cleland, K., 1981, Engineering Management, McGraw-Hill Book Co., Inc., New York

TK4011, Selected Topics: Product Technology (3 SKS)**Short Syllabus**

This course dealing with simple product engineering. Topics cover : Introduction and procedures for product engineering; demand mapping; collection, organization and screening of ideas; selection of ideas for products; product manufacturing.

Related Courses

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Bibliography

1. Cussler, E.L., Moggridge, G.D, 2001, Chemical Product Design, Cambridge University Press
2. Ulrich, K.T, Eppinger, S.D, 2000, Product Design Development, McGraw-Hill

TK4012, Introduction to Ceramic Engineering (3 SKS)**Short Syllabus**

This course dealing with fundamentals of ceramic engineering. Topics cover : Definition of ceramics and glasses; interaction between structure, processing, and properties; applications of ceramic and glass materials; ceramic and glass structure description and engineering: bonding in ceramics and glasses, phase diagrams, development of microstructure, glass random network structure, glass forming range, glass devitrification; brief review of ceramic and glass manufacturing processes; case studies and group presentations.

Related Courses

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Bibliography

1. Barsoum, Michel, 1997, Fundamental of Ceramics, McGraw-Hill Book Company
2. Shakelpond, James F., 1996, Introduction to Material Science for Engineers, 4 Edition, Prentice Hall
3. Kingery, W.D., H.K. Bowen and D.R. Ulman, 1976, Introduction to Ceramics, 2 Edition, John Wiley & Sons, New York

TK4013, Fundamental of Ceramic Processing (3 SKS)

Short Syllabus

This course dealing with fundamentals of ceramic processing. Topics cover : Processing of raw materials, preparation of ceramic batch, ceramic articles forming, drying, firing, and finishing processes; fundamental unit processes and variables influencing them.

Related Courses

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Bibliography

1. Reed, James E., 1994, Principles of Ceramic Processing, 2 Edition, John Wiley and Sons
2. Kingery, W.D., H.K. Bowen and D.R. Ulman, 1976, Introduction to Ceramics, 2 Edition, John Wiley & Sons, New York
3. , 1983, The Technology of Glass and Ceramic, Jan Havac Elsevier So. Pub. Co.

TK4020, Chemical Process Hazard Prevention (3 SKS)

Short Syllabus

This course dealing with chemical process hazards and their handlings. Topics cover : Hazard rating; Fire: types and sources; fire control techniques; noise control techniques; Pressure Safety Valve (PSV) design; case studies.

Related Courses

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Bibliography

1. Crowl, D.A. and Louvar, J.F., 1990, Chemical Process Safety: Fundamental with Application, Prentice Hall Inc
2. , . -----, Guide for Noise Control,

TK4021, Polymer Science and Engineering (3 SKS)

Short Syllabus

This course dealing with polymer properties and technology. Topics cover : Polymer structure; classification of polymeric reactions; polymerisation theory and practice: step, radical, ionic, ring-opening and transition via metallic catalysts; characterization methods; physical and mechanical properties; properties of commercial polymers.

Related Courses

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Bibliography

1. F.W. Billmeyer, Jr., 1994, Textbook of Polymer Science, 3 Edition, John Wiley & Sons
2. Stephen L. Rosen, 1982, Fundamental Principles of Polymeric Materials, John Wiley & Sons
3. R.B. Seymour, 1988, Polymer Chemistry, Marcel Dekker, Inc

TK4030, Professionalism & Entrepreneurship (2 SKS)

Short Syllabus

This course dealing with the concepts of entrepreneurship and professionalism in chemical engineering field. Topics cover : information, statement of the problem, proposed solution and stage development. Concept of entrepreneurship, entrepreneurial thinking and business cycle. Intellectual property. Market analysis and strategies.

Related Courses

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Bibliography

1. disesuaikan dengan topik, ,

TK4041, Alloys and Process Equipments (3 SKS)

Short Syllabus

This course dealing with alloys and their applications in process equipments. Topics cover : Stainless steel; Nickel and its alloys: commercial Ni, Ni-Cu, Ni-Cr, Ni-Mo, Ni-Cr-Mo, Ni-Cr-Mo-Fe-Cu, and Ni-Ti alloys; copper and its alloys: pure Cu alloys, Cu-Zn, Cu-Sn, Cu-Al, and Cu-Ni alloys; aluminium and its alloys: pure Al, Al-Cu, Al-Mn, Al-Si, Al-Mg, Al-Mg-Si, and Al-Mg-Zn alloys; anodisation process.

Related Courses

-

Bibliography

1. Surda, T. dan S. Saito, 1985, Pengetahuan Bahan Teknik, PT Pradnya Paramita, Jakarta
2. Friend, W.Z., 1980, Corrosion of Nickel-Base Alloy, John Wiley and Sons, New York
3. Callister, W.D., 1997, Material Science and Engineering, 4th ed., John Wiley and Sons, New York

TK4042, Chemical Process Corrosion (3 SKS)

Short Syllabus

This course dealing with corrosion from thermodynamics and electrochemical kinetics point of views. Topics cover : Electrochemical-thermodynamics and kinetics ; corrosion

attack models based on electrochemical reactions; electrochemical corrosion prevention methods ; corrosion case studies from the chemical industry.

Related Courses

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Bibliography

1. Fontana.,M.G., 1987, Corrosion Engineering, Mc Graw Hill Co
2. Jones,.D.A., 1992, Principles and Prevention of Corrosion, Macmillan Pub Co

TK4043, Industrial Electrochemistry (3 SKS)

Short Syllabus

This course dealing with electrochemistry. Topics cover : Introduction; basic concepts of electrochemistry; thermodynamics of electrochemical processes; electrolytic reaction kinetics; electrochemical engineering; electrochemical process industries.

Related Courses

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Bibliography

1. Prentice,G., 1991, Electrochemical Engineering Principles, Prentice-Hall Int.Ed., Singapore
2. Pletcher,D. and F.C.Walsh, 1993, Industrial Electrochemistry, Chapman & Hall, London

TK4070, Biomass Utilization (2 SKS)

Short Syllabus

This course dealing with biomass as alternatif energy. Topics cover : domestic wastes; chemical components, physical properties, morphology and dimensions; biomass as a source of energy and chemical products: utilization route; combustion: characteristics of biomass as fuel, combustion techniques, mass and energy balance; pyrolysis: techniques, product distribution, utilization of products; gasification: techniques, product composition, thermodynamics, product utilization; biogas synthesis: microbiological fundamentals, bioconversion techniques, gas composition and utilization; ethanol fermentation: microbiological fundamentals, bioconversion techniques, preparation of biomass; pulping: characterization of biomass as fibre source, pulping process, pulp characteristics and applications; hydrolysis: conversion process, product utilization, furfural production.

Related Courses

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Bibliography

1. Sofer, S.S. and O.R. Zaborsky, 1981, Biomassa Conversion Processes for Energy and

Fuels, Plenum Press, New York

2. Klass, D., 1998, Biomassa for Renewable Energy, Fuels and Chemicals, Academic Press

TK4071, Energy Management (2 SKS)

Short Syllabus

This course dealing with energy management. Topics cover : Introduction; Concept of Energy Audit; Procedure and Technique of Energy Audit; System of Boiler and Furnace; System of Steam and Condensat; Electrical System; Intake Of Heat Loss; System Control of Energy; Maintenance of Energy System; Insulation Industry.

Related Courses

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Bibliography

1. Turner, Wayne C.(Editor), 1982, Energy Management Handbook, John Willey and Sons, New York (USA)

TK4072, Cryogenic Technology (2 SKS)

Short Syllabus

This course dealing with criogenic technology. Topics cover : Applications of cryogenic technology; properties of cryogenic fluids and solids; refrigeration and liquefaction; equipment related to low temperature systems; separation and purification processes; materials storage and transport systems; cryogenic instrumentation.

Related Courses

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Bibliography

1. Timmerhaus, Klaus D. and Thomas M.Flynn, 1989, Cryogenic Process Engineering, Plenum Press, New York

TK4073, Gas Processing Technology (3 SKS)

Short Syllabus

This course dealing with natural gas. Topics cover ; Natural gas cleaning techniques: desulfurisation, carbon dioxide, condensate, and light hydrocarbon removal processes; natural gas transportation; natural gas specifications; thermodynamic fundamentals of gas refrigeration and liquefaction; LNG and LPG processing systems; LNG regasification; storage of liquefied gases; presentations based on scientific papers on gas processing technologies.

Related Courses

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Bibliography

1. Hands, B.A., Engineering Data Book, Gas Processor Association,
2. Katz, D.L. and R.L. Lee, 1986, Cryogenic Engineering, Academic Press
3. , 1990, Natural Gas Engineering, McGraw-Hill

TK4081, Selected Topics: Process Equipment (3 SKS)**Short Syllabus**

This course process equipment design systems. Topics cover :dealing with Introduction; design morphology; mathematical modelling; decision variables and parameters; methods for determining extreme values for a function; problem formulation verification: sensitivity analysis; optimization applications.

Related Courses

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Bibliography

1. disesuaikan dengan topik, ,

TK4091, Selected Topics: Process Technology (3 SKS)**Short Syllabus**

This course dealing with industrial processes and technologies. Topics cover : Review of process industrial tree based on a raw material (primary or intermediate) bearing a practical significance; commercial significance of its derivative products, and details of product manufacturing and application processes related to the industrial tree.

Related Courses

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Bibliography

1. , 1998, "Handbook of Oilseeds, Oils, Fats and Derivatives", SBP Consultants and Engineers Pvt.Ltd, New Delhi
2. Ralston, A.W., Fatty Acids and Their Derivatives, John Willey and Sons, Inc, New York

TK40K1, Industrial Internship (2 SKS)**Short Syllabus**

This course dealing with chemical engineering application in field. Topics cover : chemical process industry under the supervision of both plant engineering/technical staff and teaching staff; observation and comprehension of routine plant operations and organization; case study project related to the plant/facility.

Related Courses

1. TK3003 Bioprocess Technology Laboratory I, Prerequisites.
2. TK3102 Utility System II, Prerequisites.
3. TK3103 Heat Transfer, Prerequisites.
4. TK3104 Separation Processes I, Prerequisites.
5. TK3105 Chemical Reaction Engineering, Prerequisites.
6. TK3201 Material of Construction&Corrosion, Prerequisites.
7. TK3206 Bioreactor Design and Analysis, Prerequisites.

Bibliography

1. , 2003, Buku Panduan Pelaksanaan Kerja Praktek, Departemen Teknik Kimia ITB, Bandung

TK40K1, Industrial Internship (2 SKS)

Short Syllabus

This course dealing with chemical engineering application in field. Topics cover : chemical process industry under the supervision of both plant engineering/technical staff and teaching staff; observation and comprehension of routine plant operations and organization; case study project related to the plant/facility.

Related Courses

1. TK3003 Bioprocess Technology Laboratory I, Prerequisites.
2. TK3102 Utility System II, Prerequisites.
3. TK3103 Heat Transfer, Prerequisites.
4. TK3104 Separation Processes I, Prerequisites.
5. TK3105 Chemical Reaction Engineering, Prerequisites.
6. TK3201 Material of Construction&Corrosion, Prerequisites.
7. TK3206 Bioreactor Design and Analysis, Prerequisites.

Bibliography

1. , 2003, Buku Panduan Pelaksanaan Kerja Praktek, Departemen Teknik Kimia ITB, Bandung

TK40K1, Industrial Internship (2 SKS)

Short Syllabus

This course dealing with chemical engineering application in field. Topics cover : chemical process industry under the supervision of both plant engineering/technical staff and teaching staff; observation and comprehension of routine plant operations and organization; case study project related to the plant/facility.

Related Courses

1. TK3003 Bioprocess Technology Laboratory I, Prerequisites.
2. TK3102 Utility System II, Prerequisites.

3. TK3103 Heat Transfer, Prerequisites.
4. TK3104 Separation Processes I, Prerequisites.
5. TK3105 Chemical Reaction Engineering, Prerequisites.
6. TK3201 Material of Construction&Corrosion, Prerequisites.
7. TK3206 Bioreactor Design and Analysis, Prerequisites.

Bibliography

1. , 2003, Buku Panduan Pelaksanaan Kerja Praktek, Departemen Teknik Kimia ITB, Bandung

TK40U1, Comprehensif Examination (1 SKS)

Short Syllabus

This course is a final examination evaluating the students' overall competency upon completing all courses: covers basic sciences and mathematics, fundamental process engineering sciences, process engineering sciences, process plant utility systems, materials of construction and corrosion, waste treatment, economic evaluation, industrial chemical processes, and general knowledge related to chemical industries in Indonesia.

Related Courses

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Bibliography

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TK40U1, Comprehensif Examination (1 SKS)

Short Syllabus

This course is a final examination evaluating the students' overall competency upon completing all courses: covers basic sciences and mathematics, fundamental process engineering sciences, process engineering sciences, process plant utility systems, materials of construction and corrosion, waste treatment, economic evaluation, industrial chemical processes, and general knowledge related to chemical industries in Indonesia.

Related Courses

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Bibliography

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TK40U1, Comprehensif Examination (1 SKS)

Short Syllabus

This course is a final examination evaluating the students' overall competency upon completing all courses: covers basic sciences and mathematics, fundamental process

engineering sciences, process engineering sciences, process plant utility systems, materials of construction and corrosion, waste treatment, economic evaluation, industrial chemical processes, and general knowledge related to chemical industries in Indonesia.

Related Courses

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Bibliography

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TK40Z1, Report Writing and Seminar (2 SKS)

Short Syllabus

This course dealing with research proposal writing. Topics cover : Introduction to research methodology: definition of scientific and technical research, problem formulation, literature search and information management, construction of research plan, evaluation of results; research report preparation: abstract, description of instruments and materials, experimental procedures, description of results, discussion of results, conclusions; scientific and technical presentations: planning the presentation (formulation of objectives, analysis of audience), preparing the presentation, presentation delivery techniques, organizing the presentation forum.

Related Courses

1. TK3002 Chemical Technology Laboratory II, Prerequisites.
2. TK3004 Bioprocess Technology Laboratory II, Prerequisites.
3. TK3006 Food Technology Laboratory II, Prerequisites.

Bibliography

1. Beach, D.P. and T.K.E. Alvager, 1992, Handbook for Scientific and Technical Research, Prentice-Hall, Englewood Cliffs, N.J.
2. Day, R.A., 1988, How to Write and Published Scientific Paper, Oryx Press, Phoenix, AZ, 1988
3. Hautala, P.C., 1989, Technical and Managerial Communication, Univ. of Idaho Press, Moscow, ID

TK40Z2, Research Project (4 SKS)

Short Syllabus

This course is an execution of experimental work planned and proposed in TK40Z1; compilation of results in a formal report followed by a seminar presentation.

Related Courses

1. TK3003 Bioprocess Technology Laboratory I, Prerequisites.
2. TK40Z1 Report Writing and Seminar, Prerequisites.

Bibliography

1. Beach, D.P. and T.K.E. Alvager, 1992, Handbook for Scientific and Research, Prentice-Hall, Englewood Cliffs, N.J.
2. Day, R.A., 1988, How to Write and Publish a Scientific Paper, Oryx Press, Phoenix, AZ, 1988
3. Hautala, P.C., 1989, Technical and Managerial Communication, Univ. of Idaho Press, Moscow, ID

TK40Z3, Chemical Plant Design Project (4 SKS)

Short Syllabus

This course dealing with chemical plant design. Topics cover : Formulation of plant design problem, scope and objectives; construction of flow sheet; plant location selection; construction of process description, process flow diagram, mass and energy balance; selection and sizing of major process equipment; construction materials selection; equipment layout plot plan; construction cost estimation and plant economic analysis; piping and instrumentation diagram; plant design report preparation.

Related Courses

1. TK3002 Chemical Technology Laboratory II, Prerequisites.
2. TK40Z4 Bioprocess Plant Design Project, Prohibited.
3. TK40Z5 Food Manufacturing Design Project, Prohibited.

Bibliography

1. Baasel, W.D., 1990, Preliminary Chemical Engineering Plant Design, 2 Edition, van Nostrand, New York
2. Peters, M.S. and K.D. Timmerhaus, 1991, Plant Design and Economics for Chemical Engineers, McGraw-Hill Book Co., Inc., New York
3. Sinnott, R.K., 1985, Coulson-Richardson's Chemical Engineering Volume 6: An Introduction to Chemical Engineering Design, Pergamon Press, Oxford, 1985, bab 13.

TK40Z5, Food Manufacturing Design Project (4 SKS)

Short Syllabus

This course dealing with food plant design. Topics cover : Formulation of food manufacturing plant design problem, scope and objectives; construction of flowsheet; plant location selection; construction of process description, process flow diagram, mass and energy balance; selection and sizing of major process equipment; construction materials selection; equipment layout plot plan; construction cost estimation and plant economic analysis; piping and instrumentation diagram; plant design report preparation.

Related Courses

1. TK3006 Food Technology Laboratory II, Prerequisites.
2. TK40Z3 Chemical Plant Design Project, Prohibited.

3. TK40Z4 Bioprocess Plant Design Project, Prohibited.

Bibliography

1. Baasel, W.D., 1990, Preliminary Chemical Engineering Plant Design, 2 Edition, van Nostrand, New York
2. Peters, M.S. and K.D. Timmerhaus, 1991, Plant Design and Economics for Chemical Engineers, McGraw-Hill Book Co., Inc., New York
3. Sinnott, R.K., 1985, Coulson-Richardson's Chemical Engineering Volume 6: An Introduction to Chemical Engineering Design, Pergamon Press, Oxford, 1985, bab 13.

TK40Z4, Bioprocess Plant Design Project (4 SKS)

Short Syllabus

This course dealing with bioprocess plant design. Topics cover : Formulation of bioprocess plant design problem, scope and objectives; construction of flowsheet; plant location selection; construction of process description, process flow diagram, mass and energy balance; selection and sizing of major process equipment; construction materials selection; equipment layout plot plan; construction cost estimation and plant economic analysis; piping and instrumentation diagram; plant design report preparation.

Related Courses

1. TK3004 Bioprocess Technology Laboratory II, Prerequisites.
2. TK40Z3 Chemical Plant Design Project, Prohibited.
3. TK40Z5 Food Manufacturing Design Project, Prohibited.

Bibliography

1. Baasel, W.D., 1990, Preliminary Chemical Engineering Plant Design, 2 Edition, van Nostrand, New York
2. Peters, M.S. and K.D. Timmerhaus, 1991, Plant Design and Economics for Chemical Engineers, McGraw-Hill Book Co., Inc., New York
3. Sinnott, R.K., 1985, Coulson-Richardson's Chemical Engineering Volume 6: An Introduction to Chemical Engineering Design, Pergamon Press, Oxford, 1985, bab 13.

TK40Z1, Report Writing and Seminar (2 SKS)

Short Syllabus

This course dealing with research proposal writing. Topics cover : Introduction to research methodology: definition of scientific and technical research, problem formulation, literature search and information management, construction of research plan, evaluation of results; research report preparation: abstract, description of instruments and materials, experimental procedures, description of results, discussion of results, conclusions; scientific and technical presentations: planning the presentation (formulation of objectives, analysis of audience), preparing the presentation, presentation delivery techniques, organizing the presentation forum.

Related Courses

1. TK3002 Chemical Technology Laboratory II, Prerequisites.
2. TK3004 Bioprocess Technology Laboratory II, Prerequisites.
3. TK3006 Food Technology Laboratory II, Prerequisites.

Bibliography

1. Beach, D.P. and T.K.E. Alvager, 1992, Handbook for Scientific and Technical Research, Prentice-Hall, Englewood Cliffs, N.J.
2. Day, R.A., 1988, How to Write and Published Scientific Paper, Oryx Press, Phoenix, AZ, 1988
3. Hautala, P.C., 1989, Technical and Managerial Communication, Univ. of Idaho Press, Moscow, ID

TK40Z2, Research Project (4 SKS)

Short Syllabus

This course is an execution of experimental work planned and proposed in TK40Z1; compilation of results in a formal report followed by a seminar presentation.

Related Courses

1. TK3003 Bioprocess Technology Laboratory I, Prerequisites.
2. TK40Z1 Report Writing and Seminar, Prerequisites.

Bibliography

1. Beach, D.P. and T.K.E. Alvager, 1992, Handbook for Scientific and Research, Prentice-Hall, Englewood Cliffs, N.J.
2. Day, R.A., 1988, How to Write and Published Scientific Paper, Oryx Press, Phoenix, AZ, 1988
3. Hautala, P.C., 1989, Technical and Managerial Communication, Univ. of Idaho Press, Moscow, ID

TK40Z1, Report Writing and Seminar (2 SKS)

Short Syllabus

This course dealing with research proposal writing. Topics cover : Introduction to research methodology: definition of scientific and technical research, problem formulation, literature search and information management, construction of research plan, evaluation of results; research report preparation: abstract, description of instruments and materials, experimental procedures, description of results, discussion of results, conclusions; scientific and technical presentations: planning the presentation (formulation of objectives, analysis of audience), preparing the presentation, presentation delivery techniques, organizing the presentation forum.

Related Courses

1. TK3002 Chemical Technology Laboratory II, Prerequisites.
2. TK3004 Bioprocess Technology Laboratory II, Prerequisites.
3. TK3006 Food Technology Laboratory II, Prerequisites.

Bibliography

1. Beach, D.P. and T.K.E. Alvager, 1992, Handbook for Scientific and Technical Research, Prentice-Hall, Englewood Cliffs, N.J.
2. Day, R.A., 1988, How to Write and Published Scientific Paper, Oryx Press, Phoenix, AZ, 1988
3. Hautala, P.C., 1989, Technical and Managerial Communication, Univ. of Idaho Press, Moscow, ID

TK40Z2, Research Project (4 SKS)**Short Syllabus**

This course is an execution of experimental work planned and proposed in TK40Z1; compilation of results in a formal report followed by a seminar presentation.

Related Courses

1. TK3003 Bioprocess Technology Laboratory I, Prerequisites.
2. TK40Z1 Report Writing and Seminar, Prerequisites.

Bibliography

1. Beach, D.P. and T.K.E. Alvager, 1992, Handbook for Scientific and Research, Prentice-Hall, Englewood Cliffs, N.J.
2. Day, R.A., 1988, How to Write and Published Scientific Paper, Oryx Press, Phoenix, AZ, 1988
3. Hautala, P.C., 1989, Technical and Managerial Communication, Univ. of Idaho Press, Moscow, ID

TK5001, Chemurgy Technology (3 SKS)**Short Syllabus**

This course dealing with biomass as alternatif energy. Topics cover : Basic concepts; biomass as a renewable energy resource: concept and demand potentials; conversion technologies; organic chemicals from biomass; biomass-conversion system integrated production; net energy production.

Related Courses

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Bibliography

1. Klass, D., 1998, Biomass for Renewable Energy, Fuels, and Chemicals, Academic

Press, New York

2. Larvor, P.R. (ed), 1986, Alternative Uses of Agricultural Surpluses, Kluwer Academic Publishers, Dordrecht
3. Szmant, H.H., 1986, Industrial Utilization of Renewable Resources : An Introduction, Technomic Publishing Co., Inc., Lancaster

TK5002, Food Product Development (3 SKS)

Short Syllabus

This course dealing with food product developments. Topics cover : Theoretical and practical considerations in commercial food product development; conception, design, formulation, organoleptic evaluation, stabilization, packaging, marketing testing, and marketing of new food products.

Related Courses

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Bibliography

1. Graf, E. and Saguy, IS., 1991, Food Product Development from Concept to Marketplac,, Chapman & Hall, NewYork, NY
2. Fuller, G., 1994, New Food Product Development from Concept to Marketplace, CRC Press, Boca Raton, FL
3. Hoban, T.J., 1998, Improving The Success of Food Product Development, Food Technol. 52(1):46-49

TK5003, Starch Processing Technogy (3 SKS)

Short Syllabus

This course dealing with starch as alternatif food resources. Topics cover : Starch as a basic human need and economic commodity; economic prospect and structure of starch industries; starch structure, chemical and physical properties; starch components and sources; hydrolysis and degradation; production of starch and its derivatives; industrial utilization of starch.

Related Courses

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Bibliography

1. Whistler, R., and E.F. Paschall, 1965, Starch: Chemistry and Technology Vol.1 Fundamental Aspects, Academic Press, London
2. , Foods and Food Production Encyclopedia,
3. Kokini, J.L., C.T. Ho, M.V. Karwe, Food Extrusion Science and Technology, Culinary and Hospitality Industry Publications Ser

TK5004, Fat and Oil Processing Technology (3 SKS)

Short Syllabus

This course dealing with fat processing. Topics cover : Review of process industrial tree based on a raw material (primary or intermediate) bearing a practical significance; commercial significance of its derivative products, and details of product manufacturing and application processes related to the industrial tree; example: edible and non-edible fats/oils processing industry, perfume and fragrance chemicals industry, carbohydrate-based industries, agrochemicals industry.

Related Courses

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Bibliography

1. , 1998, "Handbook of Oilseeds, Oils, Fats and Derivatives", SBP Consultants and Engineers Pvt.Ltd, New Delhi
2. Ralston, A.W., 1948, Fatty Acids and Their Derivatives, John Willey and Sons, Inc, New York

TK5005, Plantation Product Processing Tech (3 SKS)

Short Syllabus

This course dealing with agricultural processing. Topics cover : Comprehensive review on processing technologies for and maximum utilization of agricultural plantation products, including primary crop, byproduct, excess biomass, and processing waste.

Related Courses

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Bibliography

1. Braddock, R.J., 1999, Handbook of Citrus By-Products and Processing Technology, John Wiley & Sons, New York
2. Kimball, D.A., 1999, Citrus Processing : A Complete Guide”, 2 Edition, Kluwer Academic Publishers, Dordrecht
3. Beckett, S.T., 1995, Industrial Chocolate Manufacture & Use”, 2 Edition, Kluwer Academic Publishers, Dordrecht

TK5006, Aquatic Food Resources (3 SKS)

Short Syllabus

This course dealing with aquatic food resources. Topics cover : Introduction of Aquatic Food Resources; Processing : finfish, molluscan, molluscan shellfish, crustacea (crabs, shrimp, crawfish, prawns), algae.

Related Courses

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Bibliography

1. Ward, Donn R., dan Hackney, Cameron R.(Editors), 1991, Microbiology of Marine Food Products, Van Nostrand Reinhold, New York (USA)
2. McConnaughey, Bayard H., dan Zottoli, Robert., 1983, Introduction to Marine Biology, 4 Edition, CV Mosby Company

TK5007, Entrepreneurship in Food Production (3 SKS)

Short Syllabus

This course dealing with entrepreneurship in food productions. Topics cover : Food Categories, Reasons to process foods, Food Pricing, Food Profit Margin, Food Market Characteristics, Food Business Morphology, Food Business Development, Critical Issues in Food Business, Starting Business in Food Products, Food Product Development, Technologies in Food Business, Food Business Competitiveness, Food Market Research, Food Marketing Strategy, Packaging role in Food business, Food Safety Issues, Food Product Standardization, Food Business Scale, Food Business Financing, Food Business Network, Globalization Impact on Food Business, Building the business capacity in food products, Using Information Technology for food business, Creating a Professional Image in Food Business, Lessons from success and failure experiences in food business, Bacteria control in food products, Small Business Model in Food Products.

Related Courses

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Bibliography

1. disesuaikan dengan topik, ,

TK5010, Selected Topics: Process Industries (3 SKS)

Short Syllabus

This course dealing with Indonesian process industries. Topics cover : an Overall review of selected process industries in Indonesia: cement, urea fertilizer, propylene industries; raw materials compositions, pretreatment processes, processing systems, utility systems, waste treatment, process instrumentation, and final treatment.

Related Courses

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Bibliography

1. Duda, Dipl.Ing. and Walter A., 1977, Cement Data Book, Mcdonald & Evans, London
2. Austin G.T., 1984, ShreveChemical Process Industries, 5 Edition, McGraw Hill Book Company
3. Billmeyer, F.W., Jr., 1984, Texbook of Polymer Science, 2 Edition, John Wiley and Sons Inc

TK5011, Particulate Product Engineering (3 SKS)

Short Syllabus

This course dealing with particulate product engineering. Topics cover : Introduction; particulate characterization; particle engineering and population balance; particle formation; particle size manipulation; handling of particulate products.

Related Courses

1. TK2203 Chem Engineering Thermodynamics II, Prerequisites.
2. TK2205 Particle and Fluid Mechanics, Prerequisites.

Bibliography

1. Seville, J.P,L, Tuzun, U., Clift, R., 1997, Processing of Particulate Solids, Chapman-Hall
2. Ennis and Litster, 1997, The Science and Engineering of Granulation Processes, Chapman-Hall
3. Randolph, A.D, Larson, M.A., 1988, Theory of Particulate Processes, Academic Press, New York

TK5020, Chemical Process Development (3 SKS)

Short Syllabus

this course dealing with important factors in chemical process development. Topics cover : Planning and execution of experimental work in the developmental stage of a process to generate data and experience necessary for the design, construction and profitable operation of a chemical plant; development of processes involving chemical reactions: application of chemical kinetics from the viewpoint of development, design, and interpretation for production; residence time distribution as an important factor in process development; scale-up based on phenomena occurring in various unit operations.

Related Courses

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Bibliography

1. Jordan, Donald D, PhD, PE, 1968, Chemical Process Development, Interscience Publisher, New York
2. Stan Lee and Graham Robinson, 1995, Process Development: Fine Chemicals from Grams to Kilograms, Oxford Science Publications
3. Mukesh, D., 1996, Improve your Chances for Successful Process Development, Chemical Engineering Progress, February,

TK5021, Membrane Technology (3 SKS)

Short Syllabus

This course dealing with important factors in membrane technology. Topics cover : Membrane classification; materials for membrane synthesis; membrane characterization; transport phenomena in membranes; industrial membrane processes.

Related Courses

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Bibliography

1. M.Mulder, 1991, Basic Principles of Membrane Technology, Kluwer Academic Publisher
2. Kesting, R.E., 1971, Synthetic Polymeric Membranes, McGraw-Hill Book Co.
3. K.Scott, 1995, Handbook of Industrial Membranes, Elsevier Science Publisher Ltd

TK5022, Polymer Processing Technology (3 SKS)

Short Syllabus

This course dealing with important factors in polymer technology. Topics cover : Polymer processing: plastic technology, fibre technology, elastomer technology; flow properties; polymerisation reactor; extrusion, calendering, milling, molding, mixing processes.

Related Courses

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Bibliography

1. Edward A. Mucio, 1994, Plastics Processing Technology, ASM International
2. Seymour S. Schwartz, Sidney H. Goodman, 1982, "Plastics Materials and Processes", Van Nostrand Reinhold Co

TK5030, Petroleum Refinery Technology (3 SKS)

Short Syllabus

This course dealing with important factors in petroleum. Topics cover ; Petroleum: hydrocarbon and non-hydrocarbon compositions, classification and types of petroleum; petroleum-derived products for fuel, petrochemical feedstock, etc.; primary refinery processes: atmospheric and vacuum distillation; The Secondary refinery processes: thermal, catalytic, and hydrocracking, catalytic reforming and hydroreforming, hydrogenation, isomerization, alkylation, polymerisation; lubricating oil technology; final treatment technologies.

Related Courses

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Bibliography

1. Gary, J.H. and Glen E.H., 1975, Petroleum Refining: Technology and Economic, Vol 5, Marcel Dekker Inc., New York
2. Nelson, E.L., 1985, Petroleum Refinery Engineering, 4 Edition, McGraw Hill Book Company

3. Meyers, R.E., 1986, Handbook of Petroleum Refining Process, McGraw Hill Book Company

TK5031, Catalys and Catalysis (3 SKS)

Short Syllabus

This course dealing with catalysyt. Topics cover : Introduction: industrial reactor types, fixed bed reactor; theoretical background: heterogeneous catalyst, heterogeneous catalytic reaction kinetics, transport phenomena; design and operation of reactors: modelling of fixed bed reactors, strategy and considerations in reactor design; evaluation of fixed bed reactor performance.

Related Courses

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Bibliography

1. Richardson, J.T., 1989, Principles of Catalyst Development, Plenum Press
2. Twigg, M.V., 1989, Catalyst Handbook, Wolfe Publ

TK5032, Selected Topics: Chem Reaction Eng (3 SKS)

Short Syllabus

This course dealing with industrial reactor design, especially fixed bed reactor. Topics cover ; Role of catalysts in chemical industries; development of catalysts; definition of catalyst; role of catalyst in accelerating reactions; catalytic reaction mechanisms; heterogeneous catalysts; catalytic reaction kinetics; development of catalysis theory; major constituents of catalysts; catalyst manufacturing methods; catalyst characterization; catalyst deactivation.

Related Courses

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Bibliography

1. Froment, G.F. and K.B. Bischoff, 1990, Chemical Reactor Analysis and Design, John Wiley
2. Rase, H.F., 1990, Fixed-Bed Reactor Design and Diagnostics, Butterworths

TK5040, Process System Troubleshooting (3 SKS)

Short Syllabus

This course dealing with trouble shooting systems in process industries. Topics cover : Classification of problems and troubleshooting definition; Whimbey-Lochhead practices; Kepner-Tregoe strategy; problem solution synthesis; process troubleshooting case studies.

Related Courses

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Bibliography

1. Kepner, C.B. and B.B. Tregoe, 1985, *Manajer yang Rasional* (penerjemah D. Wahid), Erlangga
2. King, C.J., 1967, *Chemical Engineering Case Problems*, AIChE
3. Saletan, D., 1994, *Creative Troubleshooting in the Chemical Process Industries*, Chapman & Hall

TK5050, Mass and Heat Transfer (3 SKS)

Short Syllabus

This course dealing with mathematics formulation in mass and heat transports. Topics cover : Introduction: diffusion in solids, fundamental equations for heat transfer, boundary conditions; one-dimensional and multidimensional steady-state conduction: rectilinear, cylindrical, and spherical coordinates, contact resistance, variable conductivity; non-steady state one-dimensional and multidimensional conduction: analysis method, rectilinear, cylindrical, spherical coordinates, phase transition, numerical methods.

Related Courses

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Bibliography

1. Cussler, E.L., 1984, *Diffusion Mass Transfer in Fluid Systems*, Cambridge University Press
2. Gebhart, B., 1993, *Heat Conduction and Mass Diffusion*, McGraw-Hill

TK5051, Selected Topics: Bioprocess Eng (3 SKS)

Short Syllabus

This course dealing with bioprocess engineering. Topics cover : Review of one or more cases in Bioprocess Engineering such as Microbial Enhanced Oil Recovery [MEOR], Bioinsecticides, Biosurfactant, Biodegradable Polymers, Antibiotics, Bioconversion and Biotransformation, Modelling and Simulation in Bioprocess Engineering .

Related Courses

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Bibliography

1. disesuaikan dengan topik, ,

TK5052, Environmental Biotechnology (3 SKS)

Short Syllabus

This course dealing with biological waste treatment technology. Topics cover

:Introduction; characterization of liquid waste; fundamentals of biological processes; aerobic waste treatment: activated sludge; biofilters; nitrogen waste treatment via nitrification and denitrification; biological phosphorus removal; anaerobic waste treatment.

Related Courses

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Bibliography

1. Henze.et.al., 1995, Wastewater Treatment: Biological and Chemical Process, Sprenger Vulag
2. Gerardi, 1994, Wastewater Biology: The Life Process, WEF Alexandra
3. , 1996, Environmental Engineering Course, TU-Deeft

TK5060, SelectedTopics:Process Computation (3 SKS)

Short Syllabus

This course dealing with computation methods applications in problem solving. Topics cover ; Comprehensive review of theory, algorithms, and practices of computation and applications in process problems and a relatively robust modern computation method for chemical engineering problems; mathematical problem formulation: sparse algebraic linear equation systems, nonlinear algebraic equation systems, ordinary differential equation systems with boundary values, partial differential equation systems, combined algebraic differential equation systems.

Related Courses

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Bibliography

1. Finlayson,B.A., 1980, Nonlinear Analysis in Chemical Engineering, McGraw-Hill
2. Hoffmann,K.A.,and S.T.Chiang, 1993, Computational Fluid Dynamics for Engineers, Vol. I dan 2, Engineering Education System,
3. Patankar,S.V., 1980, Numerical Heat Transfer and Fluid Flow, Hemisphere Publ. Corp.

TK5061, SelectedTopics:Separation Processes (3 SKS)

Short Syllabus

this course dealing with separation and purification processes. Topics cover : Detailed review of one or more cases in separation and purification: physical and chemical extraction, physical and chemical absorption, multicomponent and nonideal distillation, chemical and physical adsorption.

Related Courses

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Bibliography

1. disesuaikan dengan topik, ,

TK5062, Industrial Membrane Technology (3 SKS)

Short Syllabus

This course dealing with principles of industrial membrane technology. Topics cover : Principles of membrane technology; membrane industry: fabrication process, specifications, marketing; theoretical background: transport phenomena in membranes, fouling process; system design: module configuration, process design, operation, pre-treatment, cleaning and sanitation; industrial applications: industrial waste treatment, water purification, separation processes, vapour-liquid separation, food technology, medical, biotechnology; future industrial prospect.

Related Courses

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Bibliography

1. Baker, et.Al., 1991, Membrane Separation System, Noyes Data Corporation
2. Porter, M.C., 1990, Handbook of Industrial Membrane Technology, Noyes Publication
3. Mulder, M., 1996, Basic Principal of Membrane Technology, Kluwer Academic Publisher

TK5070, Coal Processing and Utilization (3 SKS)

Short Syllabus

This course dealing with coal processing and utilization. Topics cover : petrography; pyrolysis: basic theories, product distribution; gasification: kinetics, mechanism, catalysis, reactor design, industrial scale processes; liquefaction: process routes (direct and indirect), mechanism and kinetics of direct liquefaction, industrial scale processes; combustion: principles, types of combustion, combustion technology.

Related Courses

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Bibliography

1. Tsai, S.T., 1982, Fundamentals of Coal Beneficiation and Utilization, Coal Science and Technology 2, Elsevier
2. Elliott, M.A. (editor), 1981, Chemistry of Coal Utilization, McGraw-HiU

TK5071, Industrl Furnace Analysis & Design (3 SKS)

Short Syllabus

This course dealing with furnace designs. Topics cover : Energy: energy system, thermal energy, energy in process industries, conversion, conservation; combustion: gas, liquid, and solid fuels, flammability limits, combustion rates, heat of combustion, compositional

analysis, physical properties, combustion stoichiometry, combustion thermodynamics, thermal efficiency, energy savings, combustion operation, incomplete combustion, air pollutant emission, burner, premix, non-premix; fired industrial furnaces: direct heating, indirect heating, furnace configuration, air supply methods, instrumentation, control, furnace materials, heat transfer fluid media; heat transfer: radiation, convection, conduction; design and performance evaluation of furnaces: empirical relations, practical design procedures, computational methods in design.

Related Courses

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Bibliography

1. Susanto,H. dan Bindar,Y., 1997, Tungku Industri, diktat, Jurusan Teknik Kimia ITB
2. Rhine, J. and Tucker, 1991, Modelling of Gas-Fired Furnaces and Boilers, McGraw-Hill
3. Monnot,G., 1985, Principles of Turbulent Fired Heater, Gulf Publishing Company

TK5072, Combustion Engineering (3 SKS)

Short Syllabus

This course dealing with combustion and the matters related to it. Topics cover :
Combustion principles: excess air, adiabatic flame temperature, energy balance, chemical equilibrium, combustion reaction kinetics, equations for mass, heat, and momentum transfer limitation; premixed flame: flame propagation, flame structure, ignition, flame stabilization, flammability limits, turbulence effect, detonation; diffusion flame: laminar flame, jet flame, liquid fuel droplet combustion, solid fuel combustion, turbulent flame, open air flame, non-vertical flame, impact of wind on flame, swirl effect, flame constrained within walls, flame dimensions; complex combustion process: liquid fuel spray flame, pulverized coal flame, combustion of coal/biomass in fixed bed, combustion in fluidised bed; industrial combustion: burner, furnace, gas turbine, incinerator; problems in combustion reaction: explosion, NO_x, SO_x, CO_x, hydrocarbon and particulate emissions; safety principles: flammability, flash point, flame trap, explosion relief, fire protection.

Related Courses

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Bibliography

1. Beer, J.M. and N. Chieger, 1972, Combustion Engineering, Robert E. Krieger Publishing Company
2. Bindar, Y., 1997, Rekayasa Pembakaran, diktat, Jurusan Teknik Kimia ITB
3. Kuo,K., 1986, Principles of Combustion, John Wiley and Sons

TK5073, Thermal System Analysis (3 SKS)

Short Syllabus

This course dealing with thermal systems. Topics cover : Heat exchanger network: introduction to analysis techniques, principles of pinch technology (composite curves, maximum energy recovery, problem table), heat exchanger network configuration (rules for stream matching, splitting, loop breaking, energy relaxation), economic analysis (impact of pinch, minimum temperature difference), pre-evaluation, investment estimation based on heat transfer area, retrofit and target curve; exergy analysis: introduction to exergy concept (energy quality, physical exergy, chemical exergy, simple exergy calculations), definitions/quantities in exergy analysis (control volume, avoidable and intrinsic irreversibilities, criteria of performance), simple exergy analyses (expansion and compression, heat transfer, mixing and separation, chemical reaction and combustion), simplified chemical plant analysis examples.

Related Courses

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Bibliography

1. Kotas,T.J., 1985, The Exergy Method of Thermal Plant Analysis, Butterworths
2. Linhoff,B. (editor), 1982, A User Guide on Process Integration for Efficient Use of Energy, I, ChemE

TK5074, Multiphase Flow (3 SKS)

Short Syllabus

This course dealing with multiphases flow. Topics cover : Definition of gas-liquid, gas-solid, and solid-liquid multiphase flow; multiphase flow regimes; analysis of heat transfer in multiphase flow; design of multiphase flow piping design; introduction to factors influencing multiphase flow.

Related Courses

1. TK2205 Particle and Fluid Mechanics, Prerequisites.
2. TK3103 Heat Transfer, Prerequisites.
3. TK3202 Transport Phenomena, Prerequisites.

Bibliography

1. Wallis, Graham B., 1981, One-dimensional Two Phase Flow , McGraw-Hill Book Co. New York
2. Mc Ketta, John J., 1992, Piping Design Handbook, 10 Edition, Marcel and Dekker Inc., New York

TK5075, Radiations Heat Transfer (3 SKS)

Short Syllabus

This course dealing with radiative heat transport. Topics cover : Physical mechanism; radiation properties; radiation shape factor; relation between shape factor, heat transfer

between non-black bodies; infinite parallel surfaces; radiation shield; gas radiation; radiation network for transfer media; radiative heat transfer for spherical surfaces; radiative heat transfer involving transmission, reflection and absorption; formulation for numerical solution; solar radiation; characteristics of environmental radiation; influence of radiation on temperature measurement; radiative heat transfer coefficient.

Related Courses

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Bibliography

1. Holman, J.P., 1997, Heat Transfer, McGraw-Hill inc., New York

TK5080, Process Statistic (3 SKS)

Short Syllabus

This course dealing with application of statistics in chemical engineering processes. Topics cover : Role of statistics in research, development, and production process; objectives of statistical process control; review of basic statistical concepts; hypothesis test and regression method; review of design and interpretation of experiments; basic concepts in statistical process control; graphical tools for process control; construction and applications of control charts; measurement system and process capability analysis.

Related Courses

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Bibliography

1. Kiemele, M.J., S.R.Schmidt., and R.J.Berdine, 1999, Basic Statistics Tools for Continuous Improvement, Air Academy Press, Colorado Springs
2. Montgomery, D.C., 1999, Design and Analysis of Experiments, J. Wiley & Sons, New York

TK5091, Dynamic Modelling of Process System (3 SKS)

Short Syllabus

This course dealing with dynamic modelling in process system. Topics cover : Basic concepts: modelling fundamentals, formulation of dynamic models; Process dynamics fundamentals; Modelling of Stagewise Processes; Differential Flow and Reaction Application; Case Studies.

Related Courses

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Bibliography

1. Ingham, J., I.J. Dunn, E. Heinzle and J. E. Prenos, 1994, Chemical Engineering Dynamics: Modelling with PC Simulation, VCH, Weinheim

TK5092, Chem Eng System Optimization (3 SKS)

Short Syllabus

This course dealing with chemical engineering system optimization. Topics cover : multiple variable minimization; linear programming; optimum criteria for constrained system; non-linear programming; discrete and stagewise process optimization; examples of application in chemical engineering systems.

Related Courses

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Bibliography

1. Beightler, C.S., D.T. Philips, and Wilde, D.J., 1979, Foundations of Optimization, Prentice Hall
2. Bunday, B.D., 1984, Basic Optimisation Methods, Edward Arnold
3. Edgar, T.F. and D.M. Himmelblau, 1988, Optimization of Chemical Processes, McGraw-Hill

TK5093, Selected Topic: Process Design (3 SKS)

Short Syllabus

This course dealing with important factors in chemical process designs. Topics cover : propagation analysis, process data redundancy, identification and elimination of error, gross measurement, steady state data reconciliation, process data measurement planning; computer simulations for steady state process: development of simulation techniques, basic concepts of mass and energy balance calculations in commercial simulators, selection of equations.

Related Courses

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Bibliography

1. Madron, F., 1992, Plant Data Measurement and Optimization, Ellis Horwood
2. Mah, R.S.H., 1990, Chemical Process Structures and Deformation Flow, Butterworths
3. Westerberg, A.W., Hutchinson, H.P., Motard, R.L. and, 1979, Process Flowsheeting, Cambridge University Press

KU1011, Scientific Writing in Indonesian (2 SKS)

Short Syllabus

The subject is designed to equip the students with the knowledge and skills to express their ideas in scientific writing genre. The subject includes such teaching materials as spelling, word formation, grammar, logic, definition construction, paragraphs construction, and scientific writing organization.

Related Courses

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Bibliography

1. Alwi Hasan.et.al., Tata Bahasa Baku Bahasa Indonesia., Jakarta : Balai Pustaka
2. Depdikbud RI., Pedoman Umum Ejaan Baku, Jakarta:Balai Pustaka
3. Keraf, Gorys, Komposisi ., Ende Flores : Nusa Indah

KU1131, Sport I (1 SKS)

Short Syllabus

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Related Courses

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Bibliography

1. Bompas. Tudor O, Theory and Methodology of Training, Kendal/Hunt Publishing Company
2. Harsono, Coaching dan Aspek-aspek Psikologis Dalam Coaching, CV Tambak Kusuma
3. Lautan, Rusli, dkk., Manusia dan Olahraga. Kerjasama ITB dan FPOK IKIP Bandung, Penerbit ITB

KU2071, Pancasila and Civic Education (2 SKS)

Short Syllabus

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Related Courses

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Bibliography

1. Manheim, Karl , Ideologi dan Utopi: Menyingkap Kaitan Pikiran dan Politik, diterjemahkan oleh Drs. F. Budi Hardiman, Kanisius
2. Budiman, Arief, Teori Negara: Negara Kekuasaan dan Ideologi, PT. Gramedia Pustaka Utama, Jakarta
3. Amal Ichlasul & Armawi, Armaidly ;, Ketebukaan Informasi dan Ketahanan Nasional, Gajahmada University Press

KU2071, Pancasila and Civic Education (2 SKS)

Short Syllabus

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Related Courses

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Bibliography

1. Manheim, Karl , Ideologi dan Utopi: Menyingkap Kaitan Pikiran dan Politik, diterjemahkan oleh Drs. F. Budi Hardiman, Kanisius
2. Budiman, Arief, Teori Negara: Negara Kekuasaan dan Ideologi, PT. Gramedia Pustaka Utama, Jakarta
3. Amal Ichlasul & Armawi, Armaidly ;, Ketebukaan Informasi dan Ketahanan Nasional, Gajahmada University Press

KU2071, Pancasila and Civic Education (2 SKS)**Short Syllabus**

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Related Courses

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Bibliography

1. Manheim, Karl , Ideologi dan Utopi: Menyingkap Kaitan Pikiran dan Politik, diterjemahkan oleh Drs. F. Budi Hardiman, Kanisius
2. Budiman, Arief, Teori Negara: Negara Kekuasaan dan Ideologi, PT. Gramedia Pustaka Utama, Jakarta
3. Amal Ichlasul & Armawi, Armaidly ;, Ketebukaan Informasi dan Ketahanan Nasional, Gajahmada University Press