

ABDUS SALAM SCHOOL OF MATHEMATICAL SCIENCES

DIPLOMA FOR ACADEMIC EXCELLENCE IN MATHEMATICS

SECOND SESSION. PROGRAM.

Topic A. ALGEBRA (RINGS, FIELDS and POLYNOMIAL EQUATIONS)

Monday, 26 January 2009. Rings, Fields and Algebras. Arithmetic in integral domains (Dr. Mircea Becheanu)

Tuesday, 27 January 2009. Arithmetic with the ideals of a ring. Noetherian rings. (Dr. Marius Vladioiu)

Wednesday, 28 January 2009. Rings of polynomials. Finitely generated Algebras. Hilbert's basis theorem. (Dr. Mircea Becheanu)

Thursday, 29 January 2009. Algebraic and transcendental elements in a field extension. Algebraic extensions of a field. (Dr. Viviana Ene)

Friday, 30 January 2009. Algebraically closed fields. Steinitz's theorems. Fundamental theorem of algebra. (Dr. Mircea Becheanu)

Saturday, 31 January 2009. Splitting field of a polynomial. Normal extensions of a field. (Dr. Marius Vladioiu)

Monday, 2 February 2009.. Galois extensions. Fundamental theorem of Galois theory (Dr. Mircea Becheanu)

Tuesday, 3 February 2009. Solvability by radicals of polynomial equations(I). (Dr. Viviana Ene)

Wednesday, 4 February 2009. Solvability by radicals of polynomial equations(II). (Dr. Viviana Ene)

Thursday, 5 February 2009. Finite fields. Wedderburn's theorem. (Dr. Vakhtang Lomadze)

Friday, 6 February 2009. Irreducible polynomials over \mathbb{Q} and finite fields. (Dr. Mircea Becheanu)

Saturday, 7 February 2009. Evaluation of the participant contributions. (Dr. Mircea Becheanu, Dr. Viviana Ene and Dr. Vakhtang Lomadze)

The lectures, problem sessions and independent work hours in this topic will be directed by Dr. Mircea Becheanu, Dr. Vahtang Lomadze, Dr. Marius Vladioiu and Dr. Viviana Ene.

References

Serge Lang: Algebra

Nathan Jacobson: Algebra II

Michael Artin: Algebra

NOTE:

To download registration form for this course, please visit download section.

Topic B. GEOMETRY (SURFACES, HOMOLOGY and HYPERBOLIC GEOMETRY)

Monday, 9 February 2009. Regular polyhedra (I). Platonic solids. Euler characteristic.(Dr. Catalin Gherghe)

Tuesday, 10 February 2009. Surfaces in \mathbb{R}^3 . Curvatures. Gauss egregium.(Dr. Barbu Berceanu)

Wednesday, 11 February 2009. Regular polyhedra (II). Schläfli symbol(Dr. Catalin Gherghe)

Thursday, 12 February 2009. Surfaces in \mathbb{R}^3 . Gauss-Bonnet Theorem.(Dr. Barbu Berceanu)

Friday, 13 February 2009. Geodesics on a surface.(Dr. Barbu Berceanu)

Saturday, 14 February 2009. Regular coverings of a surface.(Dr. Oleg Mushkarov)

Monday, 16 February 2009. Classification of closed surfaces (I).(Dr. Oleg Mushkarov)

Tuesday, 17 February 2009. Hyperbolic geometry. Models: hyperbolic disc, hyperbolic halfplane, tilings.(Dr. Barbu Berceanu)

Wednesday, 18 February 2009. Cellular homology. Exact sequences in homology. Betti numbers. (Dr. Oleg Mushkarov)

Thursday, 19 February 2009. Classification of closed surfaces (II). (Dr. Barbu Berceanu)

Friday, 20 February 2009. Exact sequences in homology. Kuneth formulae(Dr. Oleg Mushkarov)

Saturday, 21 February 2009. Evaluation of the participant contributions.(Dr. Barbu Berceanu and Dr. Oleg Mushkarov)

The lectures, problem sessions and independent work hours in this topic will be directed by Dr. Barbu Berceanu and Dr. Oleg Mushkarov.

References

M.Berger:Geometry

M.do Carmo: Differentiable Geometry of Curves and Surfaces

M.Berger and B.Gostiaux: Differential Geometry

M.Hatcher: Algebraic Topology

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Topic C. MATHEMATICAL ANALYSIS. REAL FUNCTIONS OF SEVERAL VARIABLES.

Monday, 9 March 2009. \mathbb{R}^n as a metric space. Sets in \mathbb{R}^n . Sequences in \mathbb{R}^n . Summabilities of series.(Dr. Constantin Niculescu)

Tuesday, 10 March 2009. Limit and continuity of functions of several variables.(Dr. Constantin Niculescu)

Wednesday, 11 March 2009. Differential calculus of functions of several variables. (Dr. Alexander Meskhi)

Thursday, 12 March 2009. Maxima and minima. Lagrange multipliers.(Dr. Constantin Niculescu)

Friday, 13 March 2009. Mean value theorem. Taylor formula for functions of several variables.(Dr. Constantin Niculescu)

Saturday, 14 March 2009. Inverse function theorem. Implicit function theorem.(Dr. Georgi Karadzov)

Monday, 16 March 2009. Riemann integration in \mathbb{R}^n . Iterated integrals.(Dr. Alexander Meskhi)

Tuesday, 17 March 2009. Curves and surfaces in \mathbb{R}^n . Line and surface integrals.(Dr. Oleg Reynov)

Wednesday, 18 March 2009. Green, Gauss and Stokes theorems.(Dr. Alexander Meskhi)

Thursday, 19 March 2009. Improper integrals.(Dr. Oleg Reynov)

Friday, 20 March 2009. Fourier series.(Dr. Alexander Meskhi)

Saturday, 21 March 2009. Evaluation of the participant contributions. Lectures, problem sessions and independent work will be directed by Dr. Alexander Meskhi, Dr. Constantin Niculescu, Dr. Oleg Reynov and Dr. Georgi Karadzov.

References

- 1.S.M.Nikolski: A course in Mathematical Analysis.
- 2.W.L.Wade: An introduction to Analysis, Pearson Prentice Hall, 3rd Edition, 2004.
- 3.S. Douglas: Introduction to Mathematical Analysis: Addison-Wesley Higher Mathematics, 1996.
- 4.S.Lang: A first course in Calculus.
- 5.W.Rudin: real Analysis.
- 6.B.R.Gelbaum and J.M.H.Olmsted: Counterexamples in Analysis, Holden-Day, San Francisco, London, Amsterdam, 1964.
- 7.S.Dineen: Multivariate Calculus and Geometry, Springer, 2001.
- 8.R.Strichartz: A guide to distribution theory and Fourier transforms. Studies in Advanced Mathematics. CRC Press, Boca Raton, FL, 1994
- 9.G.Folland: Introduction to partial differential equations. 2nd Edition, Princeton University Press, NJ, 1995.

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