A) THEORETICAL IMMUNOLOGY

1. What is immunology, immunity, relation to neuroendocrine system.
2. Structure of the lymphatic system - primary lymphatic organs.
3. Structure of the lymphatic system - secondary lymphatic organs.
4. Cell elements involved in immune response.
5. Cell elements involved in non-specific immune response - epithelial cells, leukocytes, and non-haematopoietic cells.
6. Antigen presenting cells - involvement in the induction of immune response, classification.
7. Dendritic cells, nature and classification; their involvement in the induction of Th1 a Th2 immune response.
8. Macrophages - they role in the immune system.
9. Cell elements involved in antigen specific immune defense.
10. Relationship between cell of the innate and antigen specific immunity.
11. Humoral factors of defense in systemic (circulatory), mucosal and skin immunity (specific and non specific).
12. Classical and lectin cascade of complement - biological sense, differences.
13. Alternative complement pathway - biological sense, activation, regulation.
14. Antibodies - isotypes and subclasses, physiological concentrations, function in systemic and mucosal immunity.
15. Characteristics of antibody to antigen interaction, affinity, avidity, specificity.
16. The course of B cells activation, primary and secondary antibody response.
17. IgE – involvement in immune responses, interaction with cell surface receptors.
18. Genetic base of antibody variability, genetic recombination, sources of variability of V_H a V_L.
19. Antigens, haptens, carriers, allergen, autoantigen, superantigens.
20. Antigenicity, adjuvants, T dependent and independent antigens.
21. MHC, genomic localization, cellular distribution, hereditability, biological sense of MHC variability.
22. HLA-I a HLA-II - molecular structure, antigen MHC restriction and presentation.
23. Cytokines and chemokines - classification, biological sense.
24. Adhesive molecules - classification, biological sense.
25. T-cells, CD classification, biological sense, functions, physiological concentration in circulation.
26. TcR, structure, function, genetic recombination and sources of variability.
27. Th cells - classification, functions, cooperation with other cell elements.
28. Regulatory CD4, CD8 T cells, the mechanisms of regulatory activity.
29. Cytotoxic T cell , effector and memory functions.

30. NK cells - effector functions cytotoxic and regulatory.
31. Antigen-specific and non-specific cooperation of T a B cells during development of antibody response.
32. B1 cells and γδ T cells.

B) LABORATORY INVESTIGATIONS IN CLINICAL IMMUNOLOGY

1. Investigation of the patient with suspected allergic/immunological disorder – anamnesis, physical and laboratory examinations.
2. Sampling of the patients for immunological laboratory investigation - indication, specimens collection, storage, results interpretation.
3. Polyclonal and monoclonal antibodies in laboratory methods - preparation, properties, differences in applicability.
4. Laboratory tests for evaluation of humoral immunity - methods, reference values, indication, interpretation.
5. Laboratory tests for evaluation of lymphocyte populations counts and functions - methods, reference values, indication, interpretation.
6. Laboratory tests for evaluation of phagocytes - methods, reference values, indication, interpretation.
7. HLA–typing - methods, indication, interpretation.
8. Genotyping tests for clinical immunology – PCR, Sanger sequencing, NGS-based tests - principles, differences.
9. Principles of the investigation of the allergic patient - anamnesis, physical investigation, skin tests, exposition, elimination, and bronchoprovocation tests - indication, interpretation.
10. Immunological laboratory testing in patients with suspect primary or secondary immunodeficiencies.
11. Immunological laboratory testing in patients with cancer.
12. Immunological laboratory testing in patients with suspect autoimmunity.
13. Immunological laboratory testing in patients with suspect allergy.
14. Immunological laboratory testing in patient before and after transplantation.
15. HLA- and other molecules-polymorphism testing in patients with cancer, autoimmunity, allergy, and immunodeficiency.

C) CLINICAL IMMUNOLOGY AND ALLERGOLOGY

1. Hypersensitivity reactions classification according to Coombs and Gell - principles, differences and clinical manifestation.
2. Immediate (type I) hypersensitivity reactions - principles, clinical manifestation. Atopy.
3. Cytotoxic (type II) hypersensitivity reactions - principles, clinical manifestation.
4. Immune complexes (type III) hypersensitivity reactions - principles, clinical manifestation.
5. Delayed hypersensitivity (type IV) reactions - principles, clinical manifestation.
6. Pathophysiological role of IgE in allergy and asthma.
7. Cell elements involved in allergic reaction, mediators of allergic reaction.
8. Seasonal allergic rhinitis (hay fever, polinosis) and persistent (perennial) allergic and non-allergic rhinitis - etiopathology, clinical manifestations, therapy.
9. Allergic asthma - classification, clinical manifestation, therapy.
10. Anaphylactic reaction, etiopathology, clinical manifestation, therapy.
11. Drug allergy - symptoms, diagnosis, treatment.
12. Food allergy - symptoms, diagnosis, therapy.
13. Food intolerance (histamine, lactose), symptoms, diagnosis, therapy.
14. Hymenoptera venom allergy, symptoms, diagnosis, therapy
15. Immunodeficiencies - classification, differential diagnosis
16. Severe combined immune deficiency (SCID) - etiopathology, clinical manifestations, therapy.
17. Inherited immunodeficiency disorders - classification, etiopathology, clinical manifestation.
18. Secondary immunodeficiency disorders - classification, etiopathology, clinical manifestation.
19. Symptomatic treatments and causative therapy of immunodeficiency disorders.
20. Immune stimulation therapy - clinical applications.
21. Immunosuppressive drugs - clinical applications.
22. Immune modulation therapy.
23. Allergen-specific immunotherapy - principles, indications, practice of administering, types.
24. Biologic therapy for immunology.
25. Vaccination.