FACULTATEA DE **ÎMBUNĂTĂȚIRI FUNCIARE ŞI INGINERIA MEDIULUI**
Faculty of Land Reclamation and Environmental Engineering
DEPARTAMENTUL **MEDIU SI IMBUNATATIRI FUNCIARE**
Department of Environment and Land Reclamation

POZITIA 28 – CONFERENŢIAR

Tematică	**Curs:** **1.** Definitie, clasificare si caracteristici amenajari si constructii hidrotehnice. **2.** Amenajari si constructii hidroenergetice: caracteristici si modalitati de obtinere a energiei electrice, SEN si curbe de sarcina, energia hidraulica, utilizarea energiei cursurilor de apa, utilizarea energiei mareelor, utilizarea energiei valurilor, utilizarea energiei hidraulice prin intermediul acumularilor prin pompaj, scheme de amenajare hidroenergetica, galerii hidrotehnice, traseu si sectiuni, captuseli, castele de echilibru si derivatii fortate, centrale hidroelectrice, elemente de calcul static, masini hidraulice **3.** Amenajari si constructii hidrotehnice pentru transport pe apa: tipuri de navigatie si importanta transportului fluvial si maritim in economie, definitii, calsificari, cai navigabile – gabarite, semnalizare, biefare, ecluza, ascensor de nave, subtraversari, supratraversari, portul – aquatoriul, teritoriul, solutii constructive pentru realizarea frontului de acostare, constructii hidrotehnice pentru santiere navale **4.** Amenajari si constructii hidroedilitare: sisteme de alimentare cu apa, utilizari ale apei si cerinte de calitate ale normativelor in vigoare in functie de folosinta, sursa de apa, captari, aductiuni, statii de tratare a apei, constructii de inmagazinare a apei in sistemele de alimentari cu apa – solutii constructive, alegere, amplasare in sistem, tipuri de retele de distributie si dimensionare, statii de pompare; provenienta si proprietati ape uzate, tipuri sisteme de canalizare, retele de canalizare si scheme de amplasare, forme si dimensionare hidraulica sectiuni canale, constructii auxiliare, statii de epurare a apelor uzate **5.** Amenajari si constructii hidrotehnice hidroameliorative: definitii, clasificari, desecari si drenaj – excesul de umiditate si lucrari de eliminare, metode de desecare, elemente componente ale sistemelor de desecare, calculul debitelor de evacuat, desecari speciale, lucrari de arta pe reteaua de desecare, metode de drenaj, lucrari de drenaj, seceta, tipuri de irigare, metode de udare, tipuri de amenajari si principii generale de proiectare, surde de apa, captari, aductiuni, statii de pompare, retele de distributie, amenajari cu caracter special – orezarii **6.** Amenajari si constructii hidrotehnice pentru combaterea eroziunii solului: definitie, clasificare, scheme de amplasare si lucrari in bazinul hidrografic torential, scheme de amplasare si lucrari pe cursul torentului, scheme de constructie a barajelor de CES, conditii de amplasament si fundare, alcatuire constructiva generala, elemente de proiectare a structurilor antierozionale transversale in albie de tip baraj - ipoteze de calcul, incarcari exterioare, tipuri de calcule, schema logica de dimensionare **7.** Amenajari si constructii hidrotehnice pentru regularizari de riuri si indiguiri: procese de albie, definitii si principii generale de realizare a lucrarilor de regularizare a cursurilor de apa,

	elementele albiilor regularizate - forma in plan, sectiunea transversala si profilul longitudinal, albii stabile, metode de proiectare a axului albiei regularizate, trasarea profilului transversal stabil, verificarea nivelurilor si capacitatilor de transport ale albiei regularizate, lucrari usoare, lucrari masive, aparari si consolidari de maluri, lucrari hidrotehnice de aparare impotriva inundatiilor, indiguiri, amplasamentul si traseul digurilor, modificarea regimului de curgere prin indiguire, proiectarea digurilor, protectia taluzurilor, suprainaltarea digurilor, ruperea digurilor **8.** Amenajari si constructii hidrotehnice pentru piscicultura: definitie, clasificare, amenajari piscicole in regim natural - stavilare, trecatori de pesti, bariere de pesti, adapost si protectie, reproducere si repopulare cu peste; amenajari hidrotehnice in regim dirijat - cu apa de temperatura ridicata sau scazuta, pepiniere piscicole, crescatorii; principii si elemente de proiectare a amenajarilor piscicole **9.** Amenajari si constructii hidrotehnice pentru stuficultura – definitie, clasificare, principii de amenajare, dezvoltarea, recoltarea, depozitarea, evacuarea si transportul stufului, tipuri de amenajare si scheme hidrotehnice cu indiguire sau in regim liber de inundare, lucrari componente ale schemelor hidrotehnice de amenajare **10.** Constructii hidrotehnice generale de retentie: definitie, clasificare, baraje de greutate din beton - definitie, conditii de amplasament si fundare, alcatuire constructiva generala, etansarea si drenarea terenului de fundare, etansarea rosturilor, dispozitive de vizitare si drenare a corpului barajului; baraje fluviale - definitie, conditii de amplasament si fundare, alcatuire constructiva generala, solutii constructive ale partii fixe in sectiune transversala si in sectiune longitudinala, tipuri de stavile; baraje din materiale locale - definitie, clasificare, conditii de amplasament si fundare, solutii constructive, etansarea corpului barajului, etansarea fundatiei, filtre inverse, drenarea corpului barajului, protectia paramentelor **11.** Constructii hidrotehnice generale de derivatie: definitie, clasificare; canale - traseu in plan, sectiune transversala, profil longitudinal, pierderi de apa din canale, tipuri de impermeabilizari, drenarea captuselilor, ramificatii, evacuari, subtraversari, supratraversari; conducte - traseu in plan, sectiune transversala, profil longitudinal, tipuri de conducte, imbinari ale conductelor, masive de ancoraj, zone de dilatare; galerii – traseu in plan, sectiune transversala, sprijiniri, profil longitudinal; dimensionare hidraulica, statica si de rezistenta **12.** Descarcatori hidraulici: definitie, clasificare, functii generale si specifice; solutii constructive descarcatori de suprafata pentru diferite tipuri de baraje, solutii constructive evacuatori adincime si se semiadincime; organe de inchidere - stavile, vane, casa vanelor, detalii de executie **13.** Lucrari de disipare de energie: definitie, clasificare, functii, principii de functionare, cazuri de conjugare a biefurilor, disipatori de energie - solutii constructive asociate tipurilor de descarcatori hidraulici, rizberme, protectii terminale **14.** Accidente si avarii la constructii hidrotehnice - definitii, clasificare conform ICOLD, tipuri de evenimente, cauze, accidente istorice – studii de caz **15.** Impactul ecologic al amenajarilor si constructiilor hidrotehnice asupra mediului inconjurator: definitii, perioade de evaluare, cauze, efecte, factori de mediu; impact asupra regimului si calitatii apelor de suprafata si subterane; impact asupra solului; impact asupra florei si faunei; impact asupra aerului; impact asupra factorului social; masuri si solutii de prevenire si remediere **Aplicatii:** **1.** Calcule de atenuarea a undei de viitura in lacul de acumulare **2.** Stabilirea volumului anual si total de sedimente ce poate fi retinut de un baraj antierozional **3.** Dimensionarea hidraulica a descarcatorilor de suprafata de tip deversor cu profil practic **4.** Dimensionarea hidraulica a descarcatorilor de suprafata de tip canal frontal **5.** Dimensionarea hidraulica a descarcatorilor de tip pilnie **6.** Dimensionarea zonei deversante in varianta sectiune trapezoidala si sectiune

	dreptunghiulara pentru un baraj antierozional **7.** Dimensionarea hidraulica a golirii de fund **8.** Dimensionarea hidraulica a lucrarilor de disipare a energiei curentului de apa evacuat din lac **9.** Proiectarea unui baraj de greutate din beton – stabilirea gabaritelor structurii, incarcari exterioare, ipoteze de calcul, verificarea stabilitatii, verificarea rezistentei, inscrierea in plan, detalii de executie **10.** Proiectarea unui baraj din materiale locale cu ecran amonte din beton armat – stabilirea gabaritelor structurii, calcul de infiltratie prin corpul barajului si prin terenul de fundare, ipoteze de calcul, verificarea stabilitatii taluzurilor amonte si aval, inscrierea in plan, detalii de executie **11.** Proiectarea unui baraj din materiale locale cu nucleu central din argila – stabilirea gabaritelor structurii, calcul de infiltratie prin corpul barajului si prin terenul de fundare, ipoteze de calcul, verificarea stabilitatii taluzurilor amonte si aval, inscrierea in plan, detalii de executie **12.** Proiectarea unui baraj antierozional din beton simplu – stabilirea gabaritelor structurii, incarcari exterioare, ipoteze de calcul, verificarea stabilitatii, verificarea rezistentei, inscrierea in plan, detalii de executie **13.** Proiectarea unui baraj antierozional din gabioane – stabilirea gabaritelor structurii, incarcari exterioare, ipoteze de calcul, verificarea stabilitatii, inscrierea in plan, detalii de executie **14.** Proiectarea unui baraj fluvial – stabilirea gabaritelor structurii, incarcari exterioare in functie de solutia cosntructiva in profil longitudinal prin ax, ipoteze de calcul, mecanisme de cedare si verificarea stabilitatii, calcule de rezistenta si armare, inscrierea in plan, detalii de executie.
Topics	**Course:** **1.** Definition, classification and characteristics for water engineering and hydraulic structures **2.** Hydropower schemes and related hydraulic works: electricity characteristics and obtaining ways, National Energy System and demand curves, hydraulic energy, waterways, energy use, tidal energy use, wave energy use, hydraulic energy use through pumped storage, hydropower development schemes, hydrotechnical galleries, route and sections, linings, static calculations, hydro balance towers and forced derivations, hydropower plants, static calculation, hydraulic machines **3.** Navigation schemes and structures: types of navigation and water transport important types of navigation and water transport important in the national and global economy, definitions, classification, waterways - gauges, signaling hydraulic junction, sluice, vessels lift, undercrossing, overpass, harbors – water area, port territory, docking front constructive solutions, shipyards hydraulic engineering **4.** Water supply and sewage systems: water supply systems, water uses and quality requirements depending on water usage according to the regulations in force, water source, water collection solution, water transport, water treatment plants, water storage in water supply systems – technical solutions, location within the system, distribution networks design, pumping stations; wastewater origin and properties, sewage systems types, sewage networks and schemes, sewage cross sections and hydraulic design, auxiliary constructions, wastewater treatment plants **5.** Hydro-ameliorative schemes: definition, classification, drying and drainage - waterlogging and disposal works, drying methods, components, discharge flow calculation, special drying, art works on drying network, drainage methods, components, drought, types of irrigation, watering methods, schemes types and general design principles, water sources, water collection structures, water transport structures, pumping stations, distribution networks, special hydraulic schemes – rice plantation (paddy) **6.** Hydraulic schemes for soil erosion control: definition, classification, location scheme of

	soli erosion dams on torrential basin, dam construction technologies, site conditions and foundation, constructive solutions, design elements for frontal dam structures for soil ersion control - calculation assumptions, external loads, types of calculations, dimensioning logical chart **7.** River regularization and damming schemes: river bed processes, definitions and general principles, regulated watercourse riverbed elements - route, cross section and longitudinal profile, steady riverbeds, design methods for regularized riverbed axis determination, stable transverse profile drawing, levels and transport capacities calculation for regularized riverbed, light and massive hydraulic works, banks defense and consolidation works, flood defense and prevention schemes by hydraulic structures, river damming, dykes site and path, flow regime modification by damming, dike design, slope protection, dyke surelevation, dyke breakage **8.** Fishery hydraulic schemes: definition, classification, fish farm under natural condition – gates, fish passes, fish barriers, shelter and protection, fish breeding and restocking; fish farm under conducted condition - high or low water temperature, fish nurseries, fish farms, principles and design elements of fishery **9.** Reed cultivation hydraulic schemes: definition, classification, planning principles, development, harvesting, storage, disposal and transportation of reed, hydraulic schemes with damming or free flooding regime, component structures **10.** Storage hydraulic structures: definition, classification; concrete gravity dam - definition, site conditions and foundation, technical solution, sealing and drainage of foundation soil, joint sealing technology, drainage and visiting devices of dam body; river dam - definition, site conditions and foundation, technical solutions for cross section and longitudinal section, gate types; earth and rockfill dam - definition, classification, site conditions and foundation, technical solutions, dam body sealing, foundation soil sealing, inverse filters, dam body drainage, dam upstream and downstream protection **11.** Water diversion structures: definition, classification; channels - route, cross section, longitudinal profile, water loss, waterproofing technical solutions, drainage liners, bends, evictions, undercrossings, overpass; pipelines - route, cross section, longitudinal profile, pipe types, pipe connection, pipe anchorage, expansion areas; galleries – route, cross section, supporting structures, longitudinal profile, hydraulic, static and strength calculation **12.** Hydraulic dischargers: definition, classification, general and specific functions; technical solutions for surface dischargers on different types of dams, bottom and mid-depth outlet technical solution; locking equipement - gates, gate house, execution details **13.** Water energy dissipation structures: definition, classification, functions, operation principles, cases of flow area conjugation, energy dissipator associated to hydraulic discharger type, terminal riverbed protection **14.** Accidents and damages to hydraulic structures: definition, classification according to ICOLD, types of events, causes and effects, historical accidents - case studies **15.** Environmental impact of water schemes and hydraulc works: definition, assessment period, causes, effects, environmental factors; impact on the regime and quality of surface water and groundwater; impacts on soil; impact on flora and fauna; impact on air; impact on the social aspects; prevention and remediation measures and solutions **Applications:** 1. Calculation of flood wave mitigation in the reservoir **2.** Annual and total sediment volume retained by an soil erosion control dam **3.** Hydraulic calculation of surface spillway of practical profile type **4.** Hydraulic calculation of surface spillway of frontal channel type **5.** Hydraulic dimensioning of a funnel spillway **6.** Hydraulic calculation of the overflow area (trapezium shape and rectangular cross section) for a soil erosion control dam **7.** Hydraulic dimensioning of bottom outlet **8.** Energy dissipation works dimensioning

	9. Concrete gravity dam design - structure gauges setting, external loads, calculation assumptions, stability checking, strength evaluation, site enrolling of design structures, execution details **10.** Earth dam with concrete upstream sealing mask design - structure gauges setting, dam and foundation seepage calculation, assumptions, upstream and downstream slope stability calculation, site enrolling of design structures, execution details **11.** Earth dam with central clay core design – structure gauges setting, dam and foundation seepage calculation, assumptions, upstream and downstream slope stability calculation, site enrolling of design structures, execution details **12.** Concrete dam for soil erosion control design – structure gauges setting, external loads, calculation assumptions, checking stability, strength evaluation, site enrolling of design structures, execution details **13.** Stonecase dam for soil erosion control design – structure gauges setting, external loads, calculation assumptions, checking stability, strength evaluation, site enrolling of design structures, execution details **14.** River dam design – structure gauges setting, external loads according to longitudinal section technical solution, calculation assumptions, failure mechanisms and stability checking, strength evaluation and reinforcement computing, site enrolling of design strutures, execution details
Bibliografie	1.Priscu R., 1983. Constructii hidrotehnice, vol.I, II, Ed. Didactica si Pedagogica, Bucuresti 2.Ratiu M., Constantinescu C., 1989. Comportarea constructiilor si amenajarilor hidrotehnice, Ed.Tehnica, Bucuresti 3.Blidaru V., s.a., 2011. Amenajari complexe de-a lungul corodoarelor navale paneuropene si interioare pentru dezvoltare teritoriala, Ed Performatica, Iasi 4.Blidaru V., s.a., 2009. Dezvoltare rurala: modernizari in amenajarile de irigatii si drenaje din Romania, Ed.Performantica, Iasi 5.Chirila C., Constantinescu A., 2005. Amenajari hidrotehnice pentru navigatie, vol.I, II, Ed.Matrix-Rom, Bucuresti 6.Ciortan R., 2012. Porturi si amenajari portuare, Ed.AGIR, Bucuresti 7.Leonte C., Leonte D., 2005. Constructii si amenajari piscicole, Ed.Alfa, Iasi 8.Bara C., s.a., 1973. Exploatarea sistemelor de hidroamelioratii, Ed.Ceres, Bucuresti 9.Cazacu E., s.a., 1973. Amenajari de irigatii, Ed.Ceres, Bucuresti 10.Manoliu I., 1982. Cai navigabile si porturi, Ed.Didactica si Pedagogica, Bucuresti 11.Stematiu D., 2010, Amenajari hidroenergetice, Ed.Conspress, Bucuresti 12.*****, 1970. Manualul inginerului hidrotehnician, vol.I, II, Ed. Tehnica, Bucuresti 13.Popovici A., Popescu C., 1992. Baraje pentru acumulari de apa, vol.I, Ed. Tehnica, Bucuresti 14.Popovici A., 2002. Baraje pentru acumulari de apa, vol.II, Ed.Tehnica, Bucuresti Lefter L., 1983. Baraje de joasa cadere, Ed.Ceres, Bucuresti 15.Bala M., s.a., 1977. Baraje din materiale locale, Ed.Tehnica, Bucuresti 16.Tronac A., 2008, Structuri hidrotehnice de retentie pentru depozite de deseuri industriale, Ed.Universitara „Ion Mincu”, Bucuresti 17.Ciobanu A., 1997. Indrumator de calcul al barajelor de greutate din beton, USAMVB, Bucuresti 18.Nicolau C., Kellner P., Gazdaru A., 1980. Executarea constructiilor hidrotehnice, vol.I, II, III, Ed.Ceres, 1980 19.Stematiu D., 1988. Calculul structurilor hidrotehnice prin metoda elementelor finite, Ed. Tehnica, Bucuresti 20.Stematiu D., 2000. Safety and risk in hydrotechnical structures, Ed.HGA, Bucuresti 21.Sandi H., 2012. Structural dynamics: structural safety earthquake protection, Ed.AGIR, Bucuresti 22.*****, 1984. Accidente la constructii hidrotehnice, ISPH, Bucuresti

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